December 2, 1946

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 89

TECHNOLOGY DEPT.

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29 YEARS CONCENTRATION ON
FERRO SILICON
TO EXACT SPECIFICATIONS

• Complete laboratory facilities, including a spectograph, assure chemical control of raw materials and processes to give you Ferro Silicon of uniform chemical analysis.

• You are invited to make use of our laboratory facilities to develop special Ferro Silicon for your individual requirements.

SOUTHERN FERRO ALLOYS COMPANY
CHATTANOOGA 2, TENNESSEE

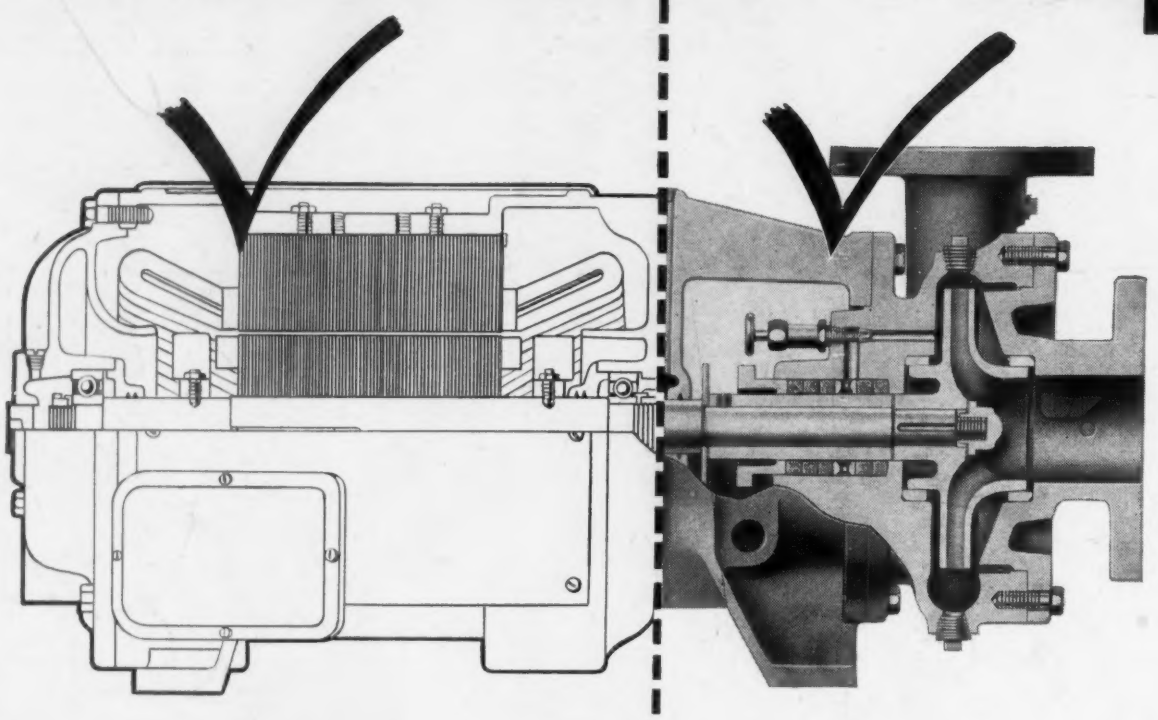
REPRESENTED IN RESPECTIVE TERRITORIES BY
MILLER and COMPANY

CHICAGO
332 S. MICHIGAN AVE.

ST. LOUIS
407 N. EIGHTH ST.

CINCINNATI
3504 CAREW TOWER

Motor *and* Pump



...combined

TO GIVE UNDIVIDED RESPONSIBILITY FOR CAPACITY... EFFICIENCY... HEAD

NOT ONE maker's pump hooked up to another maker's motor —but pump AND motor, designed and built as a unit by Allis-Chalmers.

There's no buck-passing. Allis-Chalmers backs every "Electrifugal" pump all the way — tests and checks the performance of each unit, at the factory.

FOR EVERY PUMPING NEED . . . CALL ON A-C

This versatile, popular "Electrifugal" pump is only part of the complete Allis-Chalmers line of centrifugal, axial and mixed-flow pumps — single or double suction, single or multi-stage, capacities up to 170,000 gpm. Call your A-C office or dealer — or write for bulletin B6018. ALLIS-CHALMERS, MILWAUKEE.

A2073

SPLASH-PROOF, LO-MAINTENANCE MOTOR — specially built for pump service. Sturdy, long-life rotor, interchangeable stator coils.

PUMP AND MOTOR IN ONE RUGGED FRAME, and on the same shaft. Result: perfect alignment; smooth, vibrationless operation; longer bearing life.

EASY INSTALLATION AND MAINTENANCE. Just hook up and pump . . . operates in almost any position . . . all parts easily accessible for checking and service

SIZES FROM ¾ TO 25 HP meeting a wide range of requirements as to capacity, head, and fluids to be pumped.

ALLIS-CHALMERS

★ One of the Big 3 in Electric Power Equipment ★
Biggest of All in Range of Industrial Products

Electrifugal PUMPS

It's a severe twist, all right! But for bethanized wire it's easy. Here's why.

Bethanized wire can take all kinds of severe twists and bends without cracking or flaking of the zinc because the bethanized coating is so ductile, and so perfectly bonded to the steel. It is made of zinc that's 99.9 per cent pure—pure all the way through to the steel. The coating is tightly locked to the steel base wire by an advanced electrolytic process, making the zinc and the steel almost one metal.

So tightly does this ductile zinc coating adhere to the steel that bethanized wire can be wrapped around its own diameter as shown above . . . bent back flat upon itself . . . even drawn down to fine gauge . . . all without coating failure.

What's more, bethanized wire is highly resistant to corrosion, thanks again to its superb coating. For the bethanized coating is so pure, so uniform, that it combats rust at every point. Where exceptionally severe corrosion calls for extra protection, bethanized coating-weights can be upped to three times as heavy as those called for in conventional Type 3 galvanizing.

Use bethanized wire next time a difficult fabricating job comes into your shop. Complete details about bethanized are available from the nearest Bethlehem district office. Or write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export distributor: Bethlehem Steel Export Corporation, New York

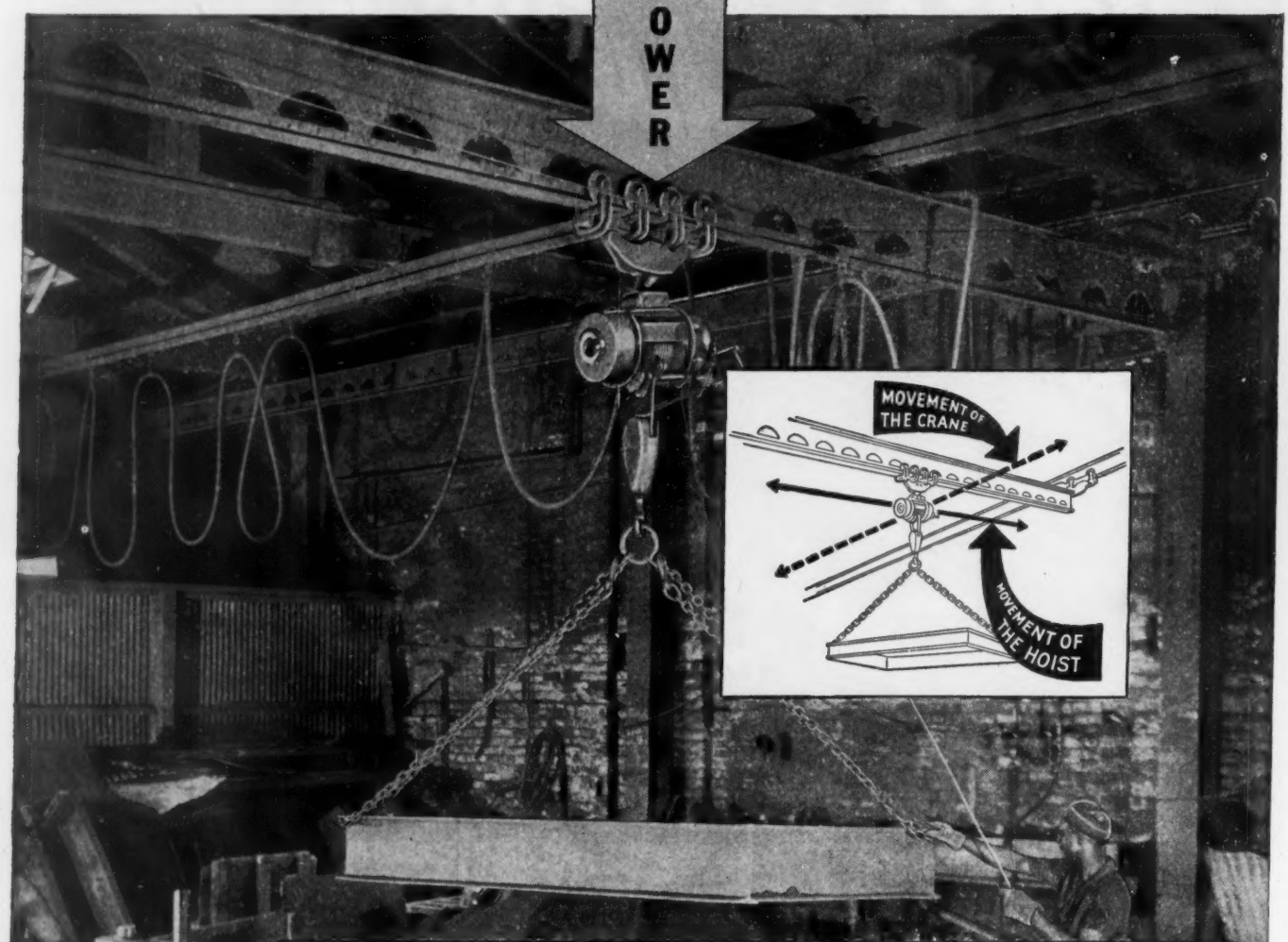
★ Bethanized Wire ★

BETHLEHEM STEEL

Don't overlook the MOVE of an Air Hoist..

LIFT

LOWER



The movement of an Air Hoist is not restricted to a single short length of hose, as is often assumed. As a matter of fact, the length of travel is no restriction. Distances of 300 or 400 feet are not uncommon.

The picture and sketch illustrate the simple hose trolley arrangement that enables an Ingersoll-Rand Overhead Air Hoist to service a large area. With the distance and movement factor easily solved, you too may enjoy the advantages of an Air Hoist—automatic safety up-and-down stop—throttle control that provides a complete range of speeds—air motor that is ideal for use in hot, gaseous atmospheres—automatic brake for holding loads.

The I-R Air Hoists are noted for their economy in the use of air, automatic lubrication, and safety-first construction.

Sizes range from 200 to 20,000 lb. capacities. Units can be furnished with a plain or hand-chain-driven trolley in place of the standard hook. A four-wheel, air-motor driven trolley is also available.

Write for full particulars on Ingersoll-Rand Overhead Air Motor Hoists.

AIR TOOLS
COMPRESSORS
CONDENSERS
ROCK DRILLS
TURBO BLOWERS
CENTRIFUGAL PUMPS
OIL & GAS ENGINES

SEVENTY-FIFTH ANNIVERSARY

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

8-928

New car by B.F.Goodrich shows how to make a bump behave

A typical example of B. F. Goodrich product development

IT'S a new kind of car built by B. F. Goodrich, but only one will ever be made. It has parts of six popular cars, put together just to demonstrate a new kind of spring. That spring, made of rubber, will add more to your riding comfort than anything since the air-filled tire replaced the solid tire years ago. It's already in use on many of the newest busses.

It eliminates the last metal-to-metal contact between rough road and car frame. It consists of a metal cylinder filled with rubber, with a shaft in the center—with the rubber firmly bonded to both cylinder and shaft. The weight of the car connected to the shaft makes it turn inside the cylinder, gives a twisting action to the rubber. The bumps and road shocks that wear you out in driving with regular springs are smothered by the soft, twisting rubber before they reach the car frame.

Naturally, this new car rides on the new B. F. Goodrich tire that outwears prewar tires, has Koroseal upholstery and uses 13 other standard B.F. Goodrich products. Now it's being lent to car manufacturers who are running tests to see just what they need to do to fit the rubber spring into their own future designs. It's typical of the research that has brought so many new developments in rubber, and constant improvement in standard products. *The B. F. Goodrich Company, Industrial Products Division, Akron, O.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*

Behind the Scenes...

Compressed Air Report—III

Well, you learn something almost every day. The thing we learned about today was the final word on that compressed air yarn, which began as a report that some Canadian plant had a natural source of compressed air, consisting of a waterfall and couple of pipes. After we printed that, the scoffers ran rampant over our prostrate form, so we appealed for help. This has arrived, in the form of a book published in 1910 and sent to us by H. F. (National Supply) Shepherd, from Springfield, O. This device is known as an entanglement type hydraulic air compressor, and the book tells all about the theory and practice of such gadgets. As Mr. S. points out, they are excellent deals, only you gotta have that waterfall first. And most waterfalls near industrial plants are famous for their scenery only, not for being natural, permanent air compressors. Any of you scoffers who want to see the evidence, we'll be glad to show it to you upon demand. And we send our thanks to Mr. Shepherd for setting us at rest on this problem.

Monkey vs Manila

Speaking of problems, we have decided to print a little different version of the monkey and rope problem:

A rope passes through a pulley and suspends on one end a weight and on the other end a monkey. The rope weighs 4 oz. per foot. The weight of the monkey in pounds equals the age of the monkey's mother in years. The age of the monkey plus the age of the monkey's mother equals four years. The monkey's mother is twice as old as the monkey was when the monkey's mother was half as old as the monkey will be when the monkey is three times as old as the monkey's mother was when the monkey's mother was three times as old as the monkey. The weight of the rope plus the weight of the weight is one half as much again as the difference between the weight and the weight plus the weight of the monkey.

How long is the rope and how old is the monkey?

This one was sent in by Fred Goshert, Harrison Radiator division, Lockport, New York, who also sent in the answer, fortunately for us. Next week, if somebody reminds us, we'll tell you what it is.

Off the Boardwalk & On the Duck

One of the high points of the metal show in Atlantic City was the duck riding concession. First time we heard it, we thought it was strictly a gag. One of our friends stopped by STEEL's booth and said he was on his way to "ride the duck". We wished him a happy ride, and thought little more about it until we discovered that he actually was out on the beach, riding up and down and into the Atlantic on duck-back, courtesy of General Allloys Corp. They had procured an amphibious truck from the army and parked it outside Convention Hall, right alongside the boardwalk. Tickets were issued to all prospective riders in the company's booth, and many a metal-man's face was wet from Atlantic salt spray during the week of the show. From where we stood, it looked kind of rough.

Hot Belts

From the looks of the exhibits, electronic heating in its various forms is the hottest thing at the moment, no pun intended. From one of the old hands at the game we learned that some 71 companies are now entered in that field, and it looked like nearly all of them were peddling their wares at the show. One of the most popular of these was the outfit who used its dielectric heating unit to make up plastic belts with brass buckles, much to the delight of the lucky guys who happened to be on hand to receive the belts. We tried hard, but the only one we could lay a hand on was a size 42, which didn't help much in holding up our size 36 pants.

Tale of a Pine Box

The boys who were hired by the hall to unpack exhibits got a real shock when they tackled the crates of Mine Safety Appliances Co. As part of their show, this outfit has a full sized dummy, completely dressed from a safety hat to safety shoes. He came to the show packed in a wooden box like any corpse would be, and when the lid was pried off there was some consternation amongst the hired help.

Preserved & Packed

That item about Mine Safety serves to remind us that Emil Kreutzberg, our eastern manager, discovered recently that the undertakers' union is a wing of the general union of Packers and Canners. All of which seems quite logical, but in a cold sort of way.

Shrdlu

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STEEL

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Editorial Staff on Contents Page

Work Simplification...

...the MULTIPRESS *Way*

MULTIPRESS has key part in all-out work-simplification program at LIONEL Corporation

Here's a close-up of a MULTIPRESS, equipped with a HydrOILic index table, doing its part in a work-simplification program at the Lionel Corporation that lowered costs and *doubled* production.

The MULTIPRESS rivets coupler coils to the "trucks" of the famous Lionel toy trains. Trucks are fed to each MULTIPRESS operator on the "train-track" chutes coming in from the right of the picture. Working with both hands, the operator simply fits a coupler coil from a nearby bin to each truck, loads the assemblies onto the index stations—and MULTIPRESS does the riveting at the rate of a thousand per hour! A sweep arm and air jet whisk the riveted pieces off the index table onto the conveyor belt.

The quiet, oil-smooth accuracy of MULTIPRESS power is a "natural" for dozens of different operations—in any kind of production. And you can see in this instance how the streamlined compactness of this powerful little bench-size tool is an important advantage. The unit fits close to the conveyor belt, permits parts-supplying chutes of minimum length, and affords maximum room for conveyor equipment as well as for the operator.

MULTIPRESS is available in 4, 6, and 8-ton capacities, in both manually and automatically controlled models offering ram actions for every type of requirement. The HydrOILic Index Table is only one of a wide variety of standard attachments and tooling accessories that adapt the basic MULTIPRESS to many different needs. Write for data suggesting how this *new kind* of oil-hydraulic production tool can help you!

The Denison Engineering Company, 1163 Dublin Rd., Columbus 16, Ohio.

HydrOILics INDUSTRY'S RIGHT HAND

DENISON EQUIPMENT *in* APPLIED *HydrOILics*

15,000 revolutions demands

PRECISION is the keynote of production at the Sharples Corporation, Philadelphia. The separators they manufacture use centrifugal force to divide various liquids into light and heavy components. To attain this centrifugal power, moving parts of the separators must rotate at exceptionally high speeds. The large bowl shells of most separators, for example, whirl at the rate of 15,000 r.p.m.—250 times a second!

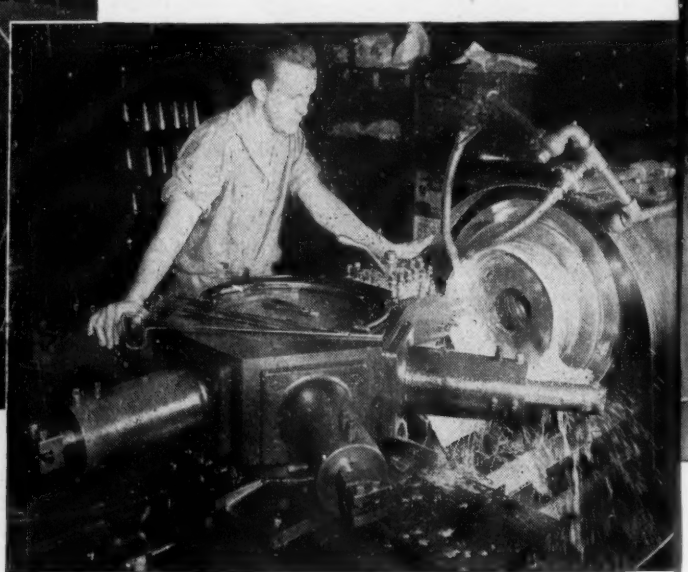
Utmost accuracy is necessary in producing parts for these separators to insure optimum clearance when the machines are in motion, to avoid vibration, and to provide for long, trouble-free operating life.

That is why Warner & Swasey Turret Lathes are used. Their rigidity holds extreme accuracy and produces fine finishes even on large chucking operations like those shown here. For example, a big, heavy-duty Warner & Swasey 4-A turns, bores and faces a large stainless steel ring forging to tolerances of a half a thousandth of an inch.

The ability of Warner & Swasey Turret Lathes to produce parts to such extreme degrees of accuracy has helped many firms earn a reputation for precision products. Our representative can show you how this accuracy, along with the speed, power, and ease of operation of Warner & Swaseys, can work for your benefit in improving and speeding production, and lowering costs.

Rigidity Needed for Heavy Chucking Jobs. *The massive work piece shown here is a bowl shell for an oil separator. It takes the unusual rigidity of a Warner & Swasey to turn this 250-lb. stainless steel forging to the high accuracy called for.*

Precision Finished to .0005". *An important part of an oil separator is the stainless steel ring shown being turned in this picture. A Warner & Swasey 4-A Turret Lathe, equipped with cross sliding hex turret, turns, bores and internal faces the piece to the close tolerance of plus or minus .0005".*



per minute
Peak Precision

Final Inspection Calls for Close Tolerances. *The completed bowl shell (22¼" outside diameter) of the oil separator must be concentric within .002 for perfect clearance when rotating at high speed.*

You can machine it better, faster, for less . . . with a Warner & Swasey

WARNER & SWASEY
Machine Tools
Cleveland

TURRET LATHES. MULTIPLE SPINDLE AUTOMATICS. PRECISION TAPPING AND THREADING MACHINES

SUITABLE FOR ANY DRIVE

B-LINE
1/6 TO 30 HP

POWER-POISE
1/6 TO 3/4 HP.

WRITE FOR
BULLETIN 5000 on MOTORS
BULLETIN 7000 on GRINDERS

Please note

We are grateful for the many letters received, complimenting us on the cooperative spirit shown those planning new developments using motor drives...and while we are striving, first, to supply customers who have been with us for years—we still will be glad to work with manufacturers who are planning now for long range requirements—our efforts are on the present, and our eyes are on the future.

ADAPTABILITY · LONG LIFE · ECONOMY
B LINE
POWER POISE

THE BROWN-BROCKMEYER CO

LEADING INDEPENDENT MOTOR MANUFACTURER

1030-1044 SMITHVILLE ROAD
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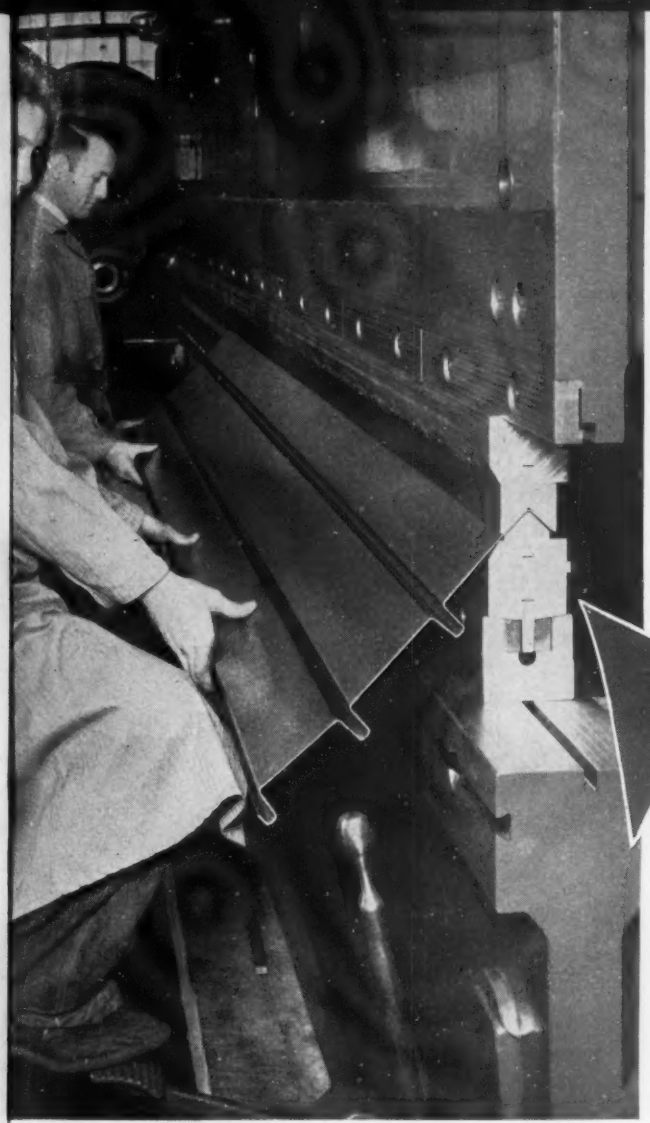
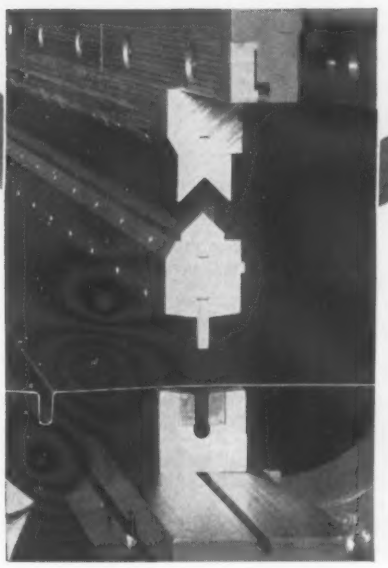
PLANTS AT DAYTON, WILMINGTON AND XENIA, OHIO—OFFICES IN PRINCIPAL CITIES

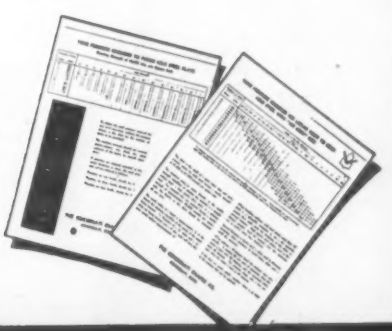


What Pressure here?



This was an unusual job. There were unusual and exacting problems in the design of the die and in the determination of the pressure. However, Cincinnati Engineering successfully designed the dies, determined pressures and recommended a Cincinnati Series 120 Press Brake for the job.

Since the pressures needed even in simple bends are governed by a number of factors, we suggest you ask the experienced Cincinnati Engineering Department for advice on your particular forming problems.



Write for Pressure Chart 8-M

This chart may be useful to you as a general guide on the pressures required on your forming jobs.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

★ For Greater Threading Production at Lower Cost

LANDIS MACHINE *Company*

WAYNESBORO, PA., U.S.A.

★

The LANDIS LINE

THREAD CUTTING MACHINES
- Landmaco Threading Machines
- Bolt Factory Threaders
- Automatic Forming and Threading Machines
- 4 Spindle Semi-Automatic Threading Machines
- Pipe and Nipple Threading Machines

THREAD CUTTING DIE HEADS
- Landmatic (for Turret Lathes and Screw Machines)
- Landex (for Automatic Screw Machines)
- Lanco (for Automatic, Semi-Automatic and Hand-Operated Threading Machines)
- Lanco Pipe and Nipple Threading Heads
- Stationary Pipe Die Heads
- Reverse Taper Die Heads
- Standard Rotary Die Heads

PRECISION THREAD GRINDERS

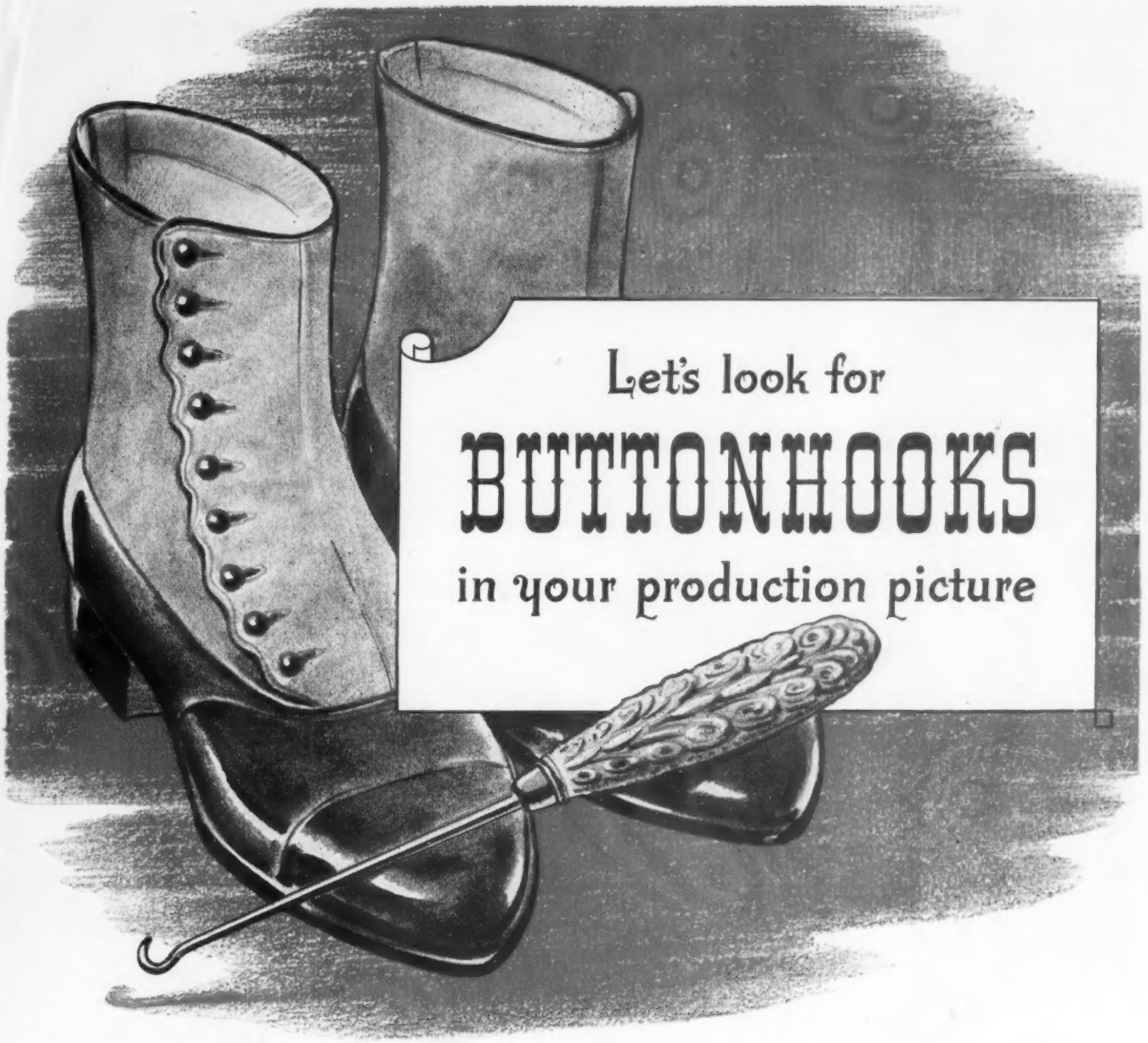
PIPE THREADING AND CUTTING MACHINES

ROLLER PIPE CUTTERS

CHASER GRINDERS

COLLAPSIBLE AND ADJUSTABLE TAPS

The Landmaco Threading Machine equipped with the Lanco Head producing Pivot Bolts to close tolerances with 100% inspection.



Even in the most modern and progressive plants, there may be certain operations that are hold-overs from another manufacturing generation. They're there by tradition, like a buttonhook on the bureau.

Take the production of parts by conventional methods. In many cases, these same parts could be produced faster, cheaper and better by using ArmaSteel in place of forgings or bar stock. This versatile metal, with its exceptional heat-treating properties, offers a wide range of physical characteristics to meet varied requirements. It greatly reduces machining requirements through the inherent economy of castings, and cuts machining time still further by providing up to 30% better machinability.

We'd like to show you some case histories of how ArmaSteel has saved money and stepped up production of parts for other manufacturers . . . and discuss what ArmaSteel can do for you. In these days of high production costs, we think you'll be particularly interested.

SAGINAW MALLEABLE IRON DIVISION OF GENERAL MOTORS, SAGINAW, MICHIGAN

CAST FOR A LEADING ROLE IN INDUSTRY

ArmaSteel*

*Reg. U.S. Pat. Off.

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...SO THAT YOU WILL GET LONGER LIFE FROM EVERY TEXROPE V-BELT

THIS MACHINE tests TEXROPE Super-7 V-Belts — runs them at varying speed and load until they give out. A trained operator records results: How long did they last? What broke down first: Cords? Cover? Rubber compound? Does destructive heat develop?

Out of tests like this have come stronger cords—tougher, more wear-resistant covers — resilient, cooler-running rubber — vital improvements in design and construction. TEXROPE Super-7 V-Belts are today the BEST in 20 years of V-Belt experience.

A-C FOR COMPLETE V-BELT SERVICE

Call your nearest Allis-Chalmers office or dealer for ALL your V-Belt drive needs — TEXROPE Super-7 V-belts all types, all sizes; TEXSTEEL, TEXDRIVE and "Magic-Grip" Sheaves; VARI-PITCH Sheaves and SPEED CHANGERS. They're all engineered and backed by the originators of the Multiple V-Belt Drive for industry. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2099

PICK YOUR SUPER-7 V-BELT

Heat-Resisting Super-7
Stands temperatures up to 180°. The TEXROPE V-Belt for most drives.

Oil-Resisting Super-7
Neoprene cover protects core against moderately oily or greasy conditions.

Oil-Proof Super-7
Made of Neoprene throughout. Use it when the belt must swim in oil.

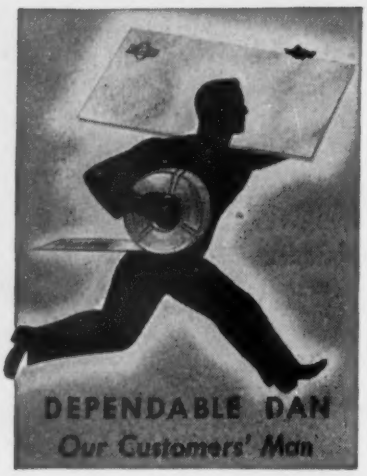
Static-Resisting Super-7
Recommended where explosion hazard exists. Static-conducting element throughout cover won't wear off.

TEXROPE Super-7 V-Belts result from the co-operative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

TEXROPE V-BELT DRIVES



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The Invisible Mark of Quality in Your Product . . . .

FROM *Chests* TO *Chairs*

Sheet and Strip Steel . . . JOB FITTED TO YOUR PRODUCT

When Reliance Job-Fitted Steel goes into your product, it gives up its own identity but in doing so, it imparts strength, beauty, serviceability and endurance. It makes for speedy, smooth production at low cost.

RELIANCE STEEL DIVISION

Detroit Steel Corporation

GENERAL OFFICES: 1025 SOUTH OAKWOOD AVE., DETROIT 9, MICH.

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ALUMINUM SHEETS *and* STRIPS—available through locations marked*

Brown & Sharpe Spiral End Mills cut *FASTER*, more *FREELY* and require *LESS POWER*

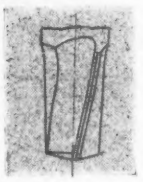
Hollow face and angle of rake

Produced by a generating process which reduces the danger of grinding burns, these edges cut more pieces per sharpening. The angle of rake reduces power consumption.

Correct number of teeth

Tooth design permits use of fewer teeth which increases cutting efficiency and enables teeth to be made much stronger with greater chip space.

Stronger teeth



The use of a double angle land, giving the desired cutting clearance without danger of the heel of the land rubbing on the work, makes these stronger teeth practical.

Correct helix angle

Two types of helix angle provide smooth cutting action . . . a small helix angle for teeth of two lipped spiral end mills for accurate milling of slots and a steep helix angle for teeth of both regular and two lipped end mills for smooth, fast-cutting action on general milling work.

Fine design features and skilled manufacture give these end mills the qualities essential for fast production. The clean-cut chips with little discoloration – not compressed – not misshapen–are visible evidence of clean cutting action – ability to take many cuts between sharpenings with a long cutter life. Brown & Sharpe End Mills will produce more work for you at lower cost. Write for literature. BROWN & SHARPE MFG. CO., Providence 1, R. I., U.S.A.

B·S

We urge buying through the Distributor

BROWN & SHARPE CUTTERS

...Well! We're Gaining!

SPEED CASE STEEL

production is slowly creeping up on orders

—and one of these days we will be able to ship you all the SPEED CASE STEEL you can use. In the meantime, why not get complete information on SPEED CASE? Be ready for SPEED CASE when it's ready for you! It's the only steel possessing such high physicals, unusual ductility, AND cuts like A.I.S.I. B1113 at 250 S.F.P.M. It has a tensile strength of 80,000-90,000 PSI. It replaces B1112, B1113, C1117, C1118, C1019 and MACHINES 40% to 50% FASTER THAN ALL OTHER CASE CARBURIZING STEELS. Prepare NOW for SPEED CASE—

★ Samples and an Expert to Show You How!

Our Speed Case Production Expert will visit your plant after samples are sent you, and show you how to set up your machines and tools to INCREASE PRODUCTION 30 to 100% and still improve the quality of your product. It's a remarkable steel.

Tear off here ATTACH TO YOUR LETTERHEAD AND MAIL TO EITHER COMPANY BELOW

ACTUAL PHOTOGRAPH

Speed Case Steel (.20 carbon) 1 inch cold drawn bar tied in a knot, cold, without fracture.

Licensor

MONARCH STEEL COMPANY

HAMMOND · INDIANAPOLIS · CHICAGO

PECKOVER'S LTD., Toronto, Canadian Distributor

MANUFACTURERS OF A COMPLETE LINE OF COLD FINISHED CARBON AND ALLOY STEEL BARS

Licensee for Eastern States

THE FITZSIMONS COMPANY

YOUNGSTOWN, OHIO

A-B Quality

This Nameplate on Your Machines

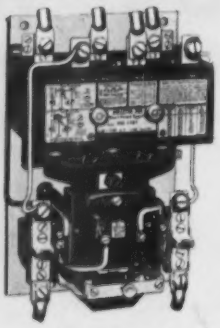
...a sure sign of QUALITY motor control

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

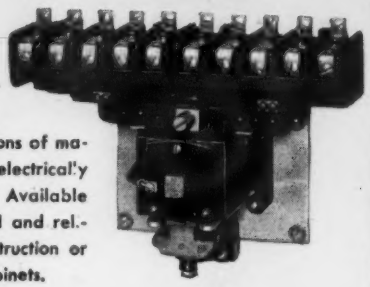
Trouble-Free
SOLENOID CONTROL UNITS
For Your Special Control Panels



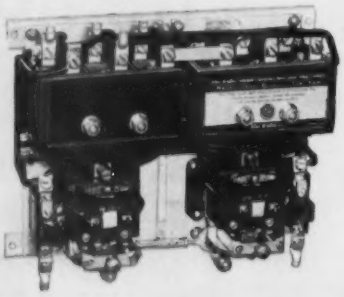
Bulletin 709 ACROSS-THE-LINE STARTERS

Designed for across-the-line starting of polyphase squirrel cage motors. Two thermal overload relays protect the motor from damage due to sustained overloads. Good for millions of trouble-free operations.

Bulletin 702 SOLENOID CONTACTORS



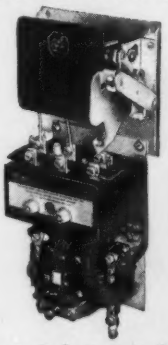
For controlling the various motions of machine tools and in all kinds of electrically operated mechanical equipment. Available in from one to ten poles. Rugged and reliable. Provided in the open construction or with several types of enclosing cabinets.



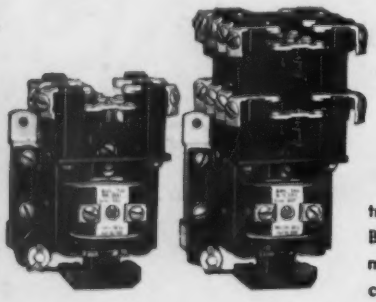
Bulletin 705 REVERSING SWITCHES

For automatically starting and reversing two- and three-phase squirrel cage and certain single-phase motors. Simple, reliable, mechanical contactor interlock.

Bulletin 712 DISCONNECT SWITCH TYPE COMBINATION STARTERS



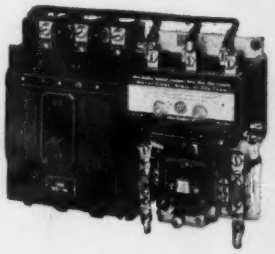
A manual disconnect switch also provided with silver alloy contacts and a solenoid type across-the-line starter mounted on a common base plate. These starters offer greater safety, require less space, and cost less to install than a separate starter and disconnect switch. Results in a more attractive job.



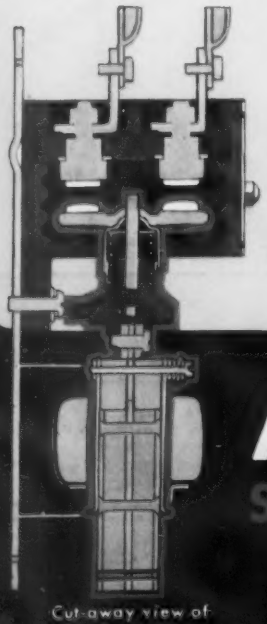
Bulletin 700 SOLENOID RELAYS

Small and inexpensive, but extremely rugged and trouble-free. Built with from one to 12 poles in many different types. Remarkably consistent in operating speed.

Bulletin 713 CIRCUIT BREAKER TYPE COMBINATION STARTERS



Consist of a solenoid type across-the-line starter and a magnetic trip ITE circuit breaker for short circuit protection. Furnished in the open construction or with several types of enclosures.



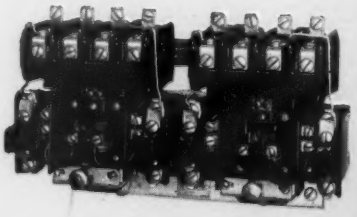
Cut-away view of Allen-Bradley solenoid starter.

Only ONE MOVING PART in these Solenoid Starters

All of the controls listed on this page utilize the simple and trouble-free Allen-Bradley solenoid mechanism. They have no hinges, pivots, or bearings to cause variations in time of operation. All have double break, silver alloy contacts that require no maintenance. Write for information.

ALLEN-BRADLEY COMPANY
1316 S. Second St., Milwaukee 4, Wis.

Bulletin 715 MULTI-SPEED STARTERS



Designed for the remote control of 2, 3, and 4 speed squirrel cage motors of either the consequent pole or separate winding types. Consist of two or more magnetic contactors, each equipped with two thermal overload relays.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

A-B Quality

WHEN

- YOUR BASIC HEAT TREATMENTS CALL FOR CHEAP LARGE-VOLUME ATMOSPHERE GENERATION
- YET . . . OCCASIONAL HIGH-CARBON WORK WOULD BE SENSITIVE TO CO_2 OR H_2O
- AND . . . SPECIAL CARBURIZING JOBS DEMAND ENRICHED ATMOSPHERES

THEN

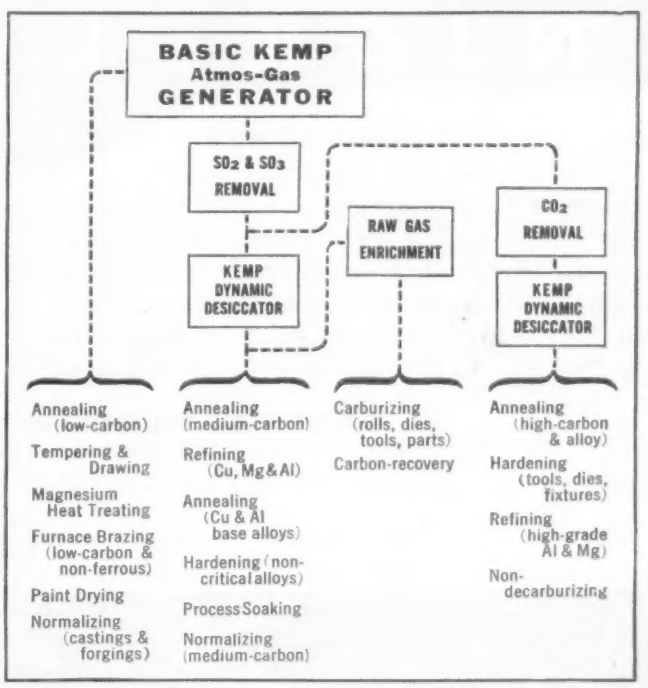
one central KEMP generator can serve all three needs

THAT'S because the basic KEMP atmosphere gas can now be modified for (1) complete desiccation, (2) complete CO_2 removal, (3) sulfur scrubbing, (4) odor removal, or (5) raw gas enrichment—any, or all, in any combination.

Thus, you can install one central atmosphere generator—fully automatic, of course—and tap off fractions of its output for special modifications to suit special needs.

The basic atmos-gas costs you only 8 to 20¢ per mcf (fuel, power, maintenance and depreciation)—the modifications, where you need them, a dime or so more.

The idea is new, but as sound as Gibraltar. Fill out the coupon for your copy of a complete 3-part technical report on the subject, just off the press.



KEMP OF BALTIMORE

PRECISION CARBURETION ✣ ADAPTED COMBUSTION FOR INDUSTRY'S HEAT USING PROCESSES
ATMOSPHERE GENERATION & ADSORPTIVE DRYER SYSTEMS FOR PROCESS CONTROL AND PROTECTION

JMLco K-MI st

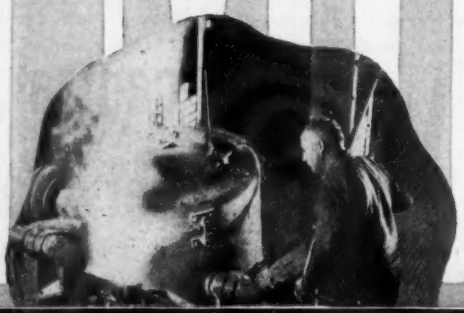
The C. M. Kemp Mfg. Co.
405 E. Oliver Street, Baltimore 2, Md.

Send me without delay your complete 3-part report, "A Critical Survey of Controlled Atmospheres" ☐

My processes are _____

NAME _____
POSITION _____
COMPANY _____
PLACE _____

SEYMOUR



NICKEL SILVER

THE IDEAL BASE FOR PLATED WARE

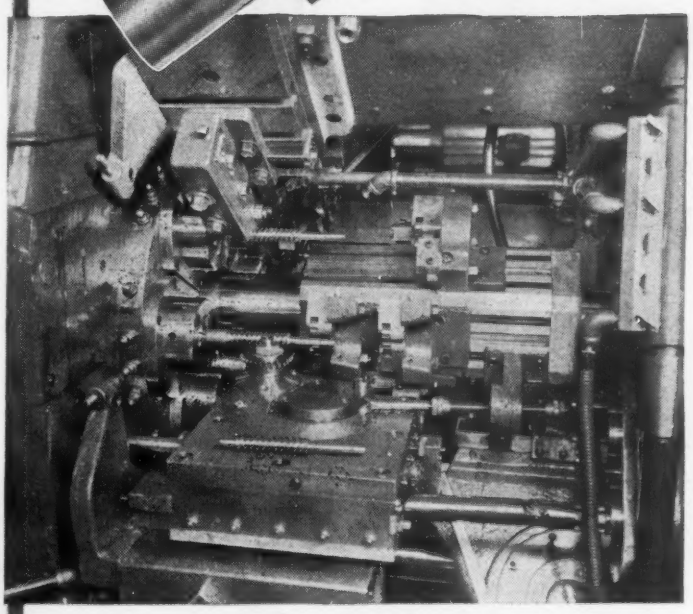
The base, or "body," of much of the silver, nickel and chromium plated ware made in this country is Seymour Nickel Silver—an alloy of copper, nickel and zinc. Tarnish-resistant, silvery-white in color—when it is eventually exposed by wear, there is no unsightly contrast. It is capable of any degree of ductility, from dead soft to spring temper. This makes it the perfect alloy for spinning, drawing and stamping. When leaded, it has excellent workability and causes no undue wear on tools. If your present metal or alloy is not all that it should be, why not change to Seymour Nickel Silver?

THE SEYMOUR MANUFACTURING CO., SEYMOUR, CONN.

NONFERROUS ALLOYS SINCE 1878

Where it pays

TO EXCEED OLD SPEED LIMITS



The accurate thread on this worm shaft is generated by means of one attachment mounted on the cross slide, and making only one pass to complete the thread.

Every progressive manufacturer long ago learned these two facts:

1. Lower selling prices tend to broaden markets, and thus increase sales.
2. Lower production costs make lower selling prices possible.

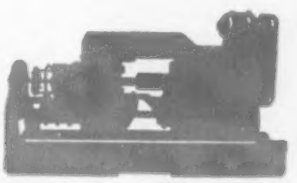
For instance, here's a typical case of cost cutting in big production. This worm shaft, 7/8" by 7½" long, made from 1144 cold rolled steel, requires 10 operations.

Acme-Gridley's "bid on the job", on a 1⅝' Bar Automatic, is 1 minute 25 seconds machine time. Precision and finish meet all requirements.

Ask your own production department for a "competitive bid", using equipment now in your shop.

Or write to us for a machine time estimate on any metal precision part you want to produce in quantity.

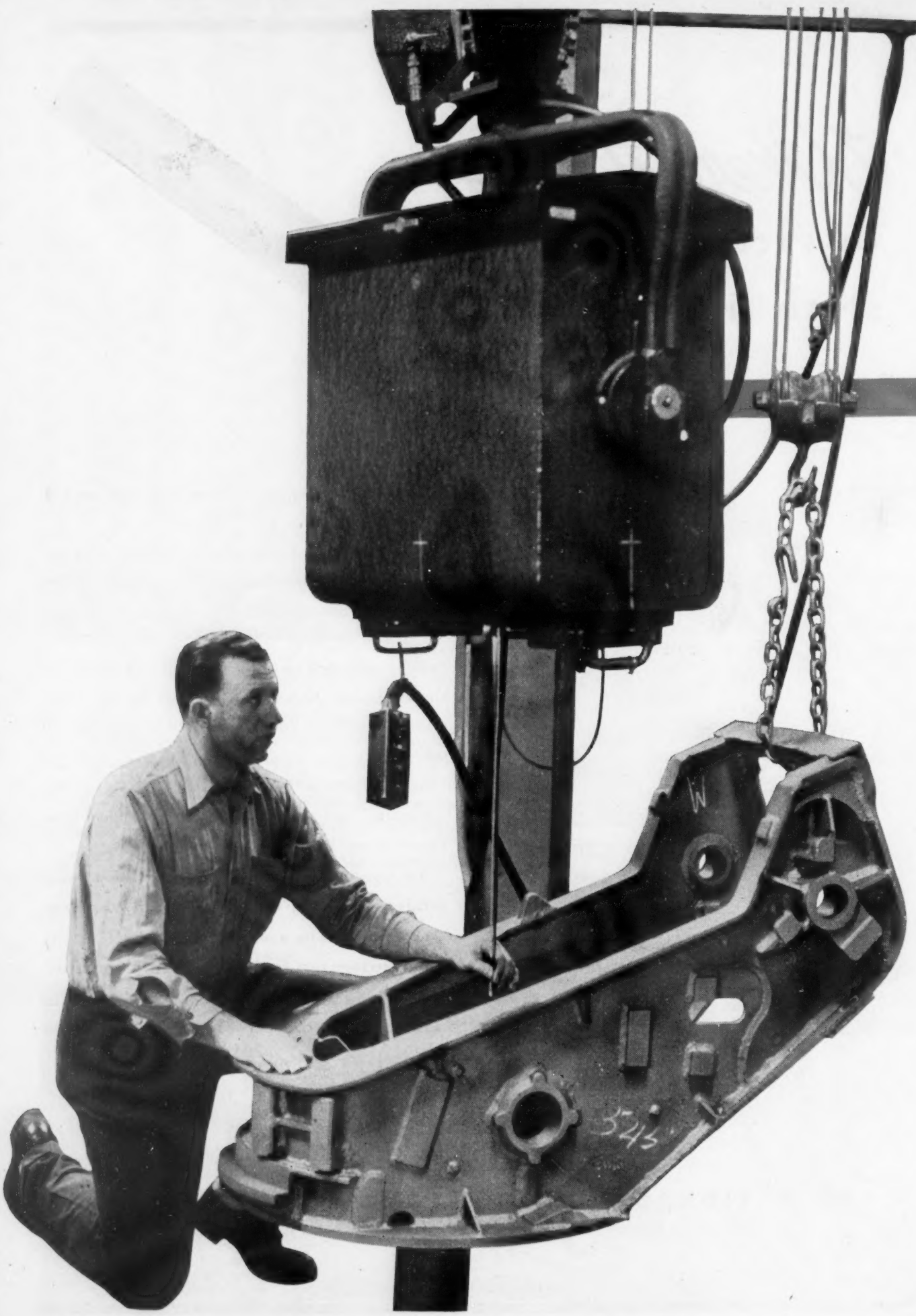
Cost reductions like this one have direct bearing on both sales volume and profit and loss statements.



ACME-GRIDLEY BAR and CHUCKING AUTOMATICS
Maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL ACME COMPANY

170 EAST 131st STREET. • CLEVELAND 8, OHIO



HERE'S WHY G-E X-RAY UNITS PAY REAL DIVIDENDS

The experience of hundreds of satisfied users proves that G-E X-Ray Industrial Units can be relied upon to pay real dividends—both scientific and economic.

No matter what you make there's a G-E X-Ray Industrial Unit available in a voltage range and with a mounting structure to meet your need. And you can be sure that your G-E X-Ray Unit will be a profitable, dividend-paying investment. With it you can . . .

INSURE QUALITY. With a G-E X-Ray Industrial Unit in your plant, you and your customers gain the benefits of using x-ray as a guide to the development and control of improved foundry and welding techniques.

CUT PRODUCTION COSTS. Many users of G-E X-Ray Industrial Units have found that improved foundry techniques, based upon x-ray examinations of pilot castings, doubled the yield from a single melt.

CUT REJECTS. Owners of G-E X-Ray Industrial Units report that improved foundry techniques reduce to almost nothing the cost of replacing defective castings. In some cases, this saving alone has been enough to pay for the x-ray equipment. And customers appreciate that flaw-free castings provide them substantial savings in machining costs, increased productive machine time, and longer cutting tool life.

CAN X-RAY BE APPLIED TO YOUR BUSINESS? The chances are it can. And to help you decide, G-E X-Ray offers you the services of its corps of experienced x-ray engineers to assist you in selecting the right unit to meet your need. And if x-ray cannot be applied effectively and economically, they will be the first to tell you.

GENERAL ELECTRIC X-RAY CORPORATION

TWO INTERESTING BOOKLETS AVAILABLE

Use the handy coupon to request your copy of the interesting 36-page booklet, THE STORY OF X-RAY, and the illustrated, fact-filled 34-page INDUSTRIAL APPLICATIONS OF THE X-RAY. There's no obligation, of course.

CLIP, SIGN, and MAIL, TODAY

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Chicago 4, Illinois

Without obligation, please send me a copy of THE STORY OF X-RAY and a copy of INDUSTRIAL APPLICATIONS OF THE X-RAY for my file.

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City _____ *State* _____

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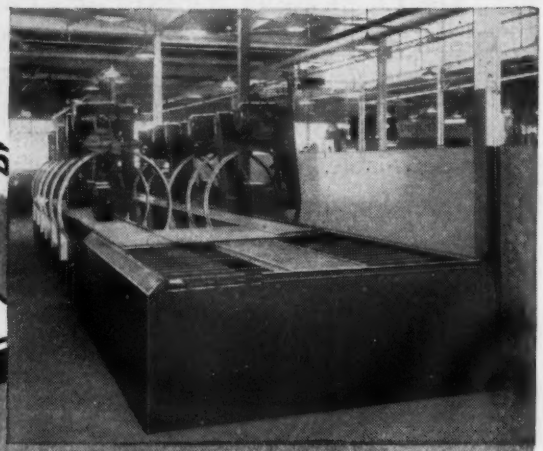
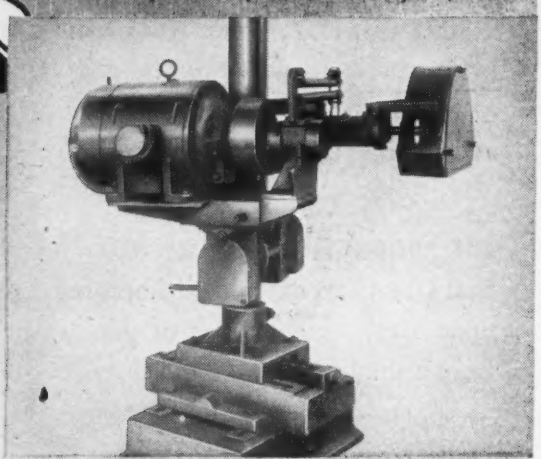
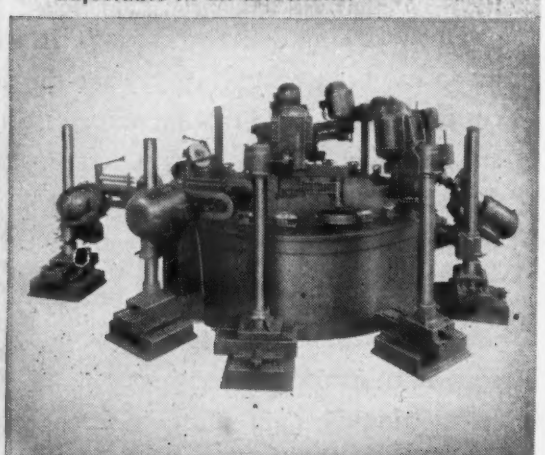
WHY NOT *INCREASE* PRODUCTION IN YOUR POLISHING ROOM AND GREATLY REDUCE YOUR COSTS?



Udylite Double Conveyor Square Transfer Machine polishes parts both ways.



Pedestal Type Polishing Head which is adjustable in all directions.



Udylite Rotary Polishing Machine equipped with indexing mechanism.

Whether you are polishing auto door handles, watch cases, toaster bodies, or something else a Udylite Polishing Machine with one operator will give you more production in less floor space than a number of lathes each with its own operator.

Not only that but each piece will be polished evenly over all surfaces and every piece will look like every other piece because they are all presented to the wheels in the same manner.

Thus Udylite Polishing Machines permit you to economize on floor space, machinery, machine maintenance and man power—also to do higher quality work with operators who need not be as highly skilled as lathe hands.

A simple investigation will show you how quickly you could amortize an installation in your plant. Why not ask a Udylite engineer to make such an investigation.

2421

THE **Udylite** CORPORATION
1651 EAST GRAND BOULEVARD
DETROIT 11, MICHIGAN
REPRESENTATIVES IN ALL PRINCIPAL CITIES

the paint holds!
Long paint life is only part of the story when you use ARMCO Galvanized PAINTGRIP Sheets for your products. Since there is no need for surface pretreatments of any kind, you save enough in preparation costs to more than pay for the difference between PAINTGRIP and regular galvanized. Most important, you get "customer insurance," because paint on ARMCO Galvanized PAINTGRIP lasts several times longer than on ordinary sheets.
No early peeling or flaking.
No finish complaints. Write for free booklet giving all the facts.
The American Rolling Mill Co.,
4404 Curtis St., Middletown, Ohio.
SPECIAL-PURPOSE SHEET STEELS
GALVANIZED PAINTGRIP
ARMCO
STEEL
THE AMERICAN ROLLING MILL COMPANY

Advertisement

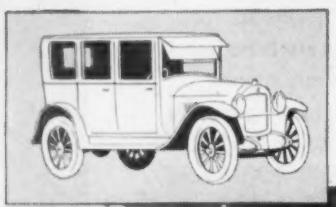
DECEMBER, 1946

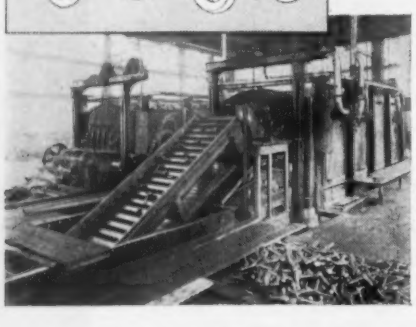
R-S FURNACE FACTS

ISSUED MONTHLY BY R-S PRODUCTS CORPORATION, PHILADELPHIA 44, PA., FOR THOSE CONCERNED WITH QUALITY HEATING OF METALS

23 Years Ago...an R-S "First" which Started an Era

Old hands in the American Society for Metals (then called the Steel Treaters) will remember this particularly famous group of 1923 furnaces. The Bureau of Mines took movies of them; "Mike" Watson, metallurgist for the user company (American Gear & Mfg. Div. of Hupp Motors) toured ASM chapters and technical colleges giving speeches about them; and Professor Trinks wrote the details of their design into his now-famous





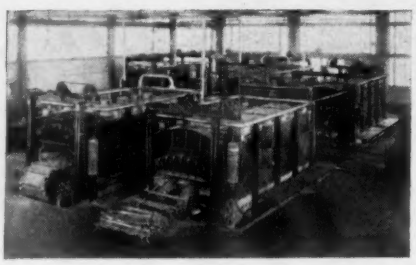
texts (see, Industrial Furnaces, Vol. II, 2nd ed., Figs. 250, 253, 256 and 279).

Why so famous?

Well, Sir, this family of four R-S furnaces made up *the very first continuous, automatic heat treating line for automotive parts*—and started the era of production-line heat treating we know today.

Here's the job they did. They took an endless stream of Hupmobile steering-knuckles and axle forgings through the harden-quench-and-draw cycle by fully mechanized means. The axle hardening furnace was an early walking-beam type. Other units in the line employed chain-conveyor and continuous-belt handling. All were oil fired. Temperature control was automatic. In fact, so young was automatic temperature control in 1923 that R-S had to build the control valve itself—one of the first such valves.

Our point is this! R-S has been around for a long time—with progressive, but practical, design sense of the brand that



makes improved production ideas work.

And if you study the photos closely, you'll see that the same principles of construction (geared door hoists, chain take-ups, ample expansion provisions, etc.) which characterize good furnace design today, characterized R-S methods 'way back in the early days of 1923.

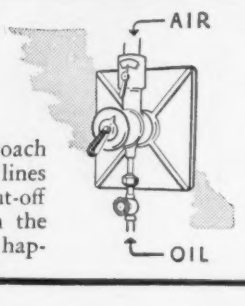
ON BUYING FACTORY-BUILT FURNACES

A furnace not built on your premises
May become, without warning, a nemesis.
Hidden faults of erection
May pass your inspection,
And assert themselves later—with emphasis.

But buy it, instead, from R-S,
And its "insides" you won't have to guess.
You can kibitz the making;
See the care we are taking
To keep year-round maintenance less.

Furnace men seem to like limericks that have to do with the business. Since starting to print them this Fall (see the October and November FURNACE FACTS), we find that there are several "bards-of-the-craft". If you're limerick-looney too, send in your contributions. We'll print them.

Tip on Oil Burner Piping



Be sure that oil branch lines approach burners *from below*. Let the air lines come down from above. Then, if shut-off valves leak or jam, drainage is in the right direction. Imagine what could happen when you light your furnace after oil has leaked *into* the furnace chamber during periods of shut-down.

It's details like this which have earned the respect the R-S nameplate enjoys.

...and Here's the Man Who Designed Them

Meet our own vice president and chief engineer, D. E. Wyman, who designed

the Hupp axle and knuckle furnaces which started the era of continuous sequence heat treatment above discussed.

For those who don't yet know Mr. Wyman, despite 33 years in industrial furnace design, it will be worth noting that, in addition to being the father of the famous Hupp harden-quench-and-draw lines of 1923, he designed the Navy's first ordnance furnaces at Pearl Harbor; led the R-S engineering crew during two world wars; is an authority on rotary, pusher and conveyor furnace construction; knows how products behave under heat (from copper spark-plug gaskets in the annealing range to forging ingots at 2300°F or hundred-ton weldments being stress relieved); and has done outstanding development work on materials handling mechanisms for high temperature service.

Since 1913 he's been active at metal-men's meetings and furnace-men's round-ups—but mostly he's home at R-S in Philadelphia working for you—making good furnaces better.

JML co P-M1

Factory-wired, conveniently packaged Reliance V★S Drive provides unlimited range of adjustable speeds for Diesel locomotive axle grinder.

Whatever your product, whatever the machines used in making it, Reliance V★S Drive can increase the speed of production — and reduce your costs at the same time. V★S, the *All-electric, Adjustable-speed Drive operating from A-c. Circuits,* has done just this in many thousands of diversified applications.

On-the-spot conversion of A-c. power by the V★S Drive offers you unlimited flexibility of operation through automatic or manual control, either at the machine or from remote stations. Specifically, this means lightning starts and stops, stepless speed changes, maintenance of proper tension, reversal at any desired point, plus your choice of other specialized functions. For more details of V★S operation, return coupon below today!

RELIANCE V★S DRIVE

RELIANCE ELECTRIC & ENGINEERING CO.
1081 Ivanhoe Road • Cleveland 10, Ohio

Appleton, Wis. • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Denver
Detroit • Gary • Grand Rapids • Greenville • Houston • Kansas City • Knoxville
Los Angeles • Milwaukee • Minneapolis • New Orleans • New York
Pittsburgh • Portland, Ore. • Rockford, • St. Louis • San Francisco • Seattle
Syracuse • Tampa • Tulsa • Washington, D. C.
Sao Paulo, Brazil

MAIL THIS COUPON TODAY!

RELIANCE A-C D-C MOTORS
"Motor-Drive is More Than Power"

RELIANCE ELECTRIC & ENGINEERING CO.
1081 Ivanhoe Road (Dept. 2), Cleveland 10, Ohio

Please send your Bulletin 311 describing the operation and advantages of the Reliance V★S Drive.

NAME_____
COMPANY_____
TITLE_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

Stained Glass AND HEVI DUTY FURNACES

An MU-152412 Hevi Duty Box Furnace in the studio of Conrad Pickel, Waukesha, Wis.

Milwaukee Journal Photo

Versatility of use of Hevi Duty Box Type Furnaces is illustrated in the manufacture of stained glass church windows by Conrad Pickel, Waukesha, Wis. This furnace is operated normally at 1250° F. Hevi Duty Electric Heat Treating Furnaces are carefully designed to meet the needs of industry generally where accurately controlled temperatures to 2350° F. are required. There is a type and heat range for your particular needs — send for Bulletin HD-441 — and tell us your heat treating problems.

HEVI DUTY ELECTRIC COMPANY

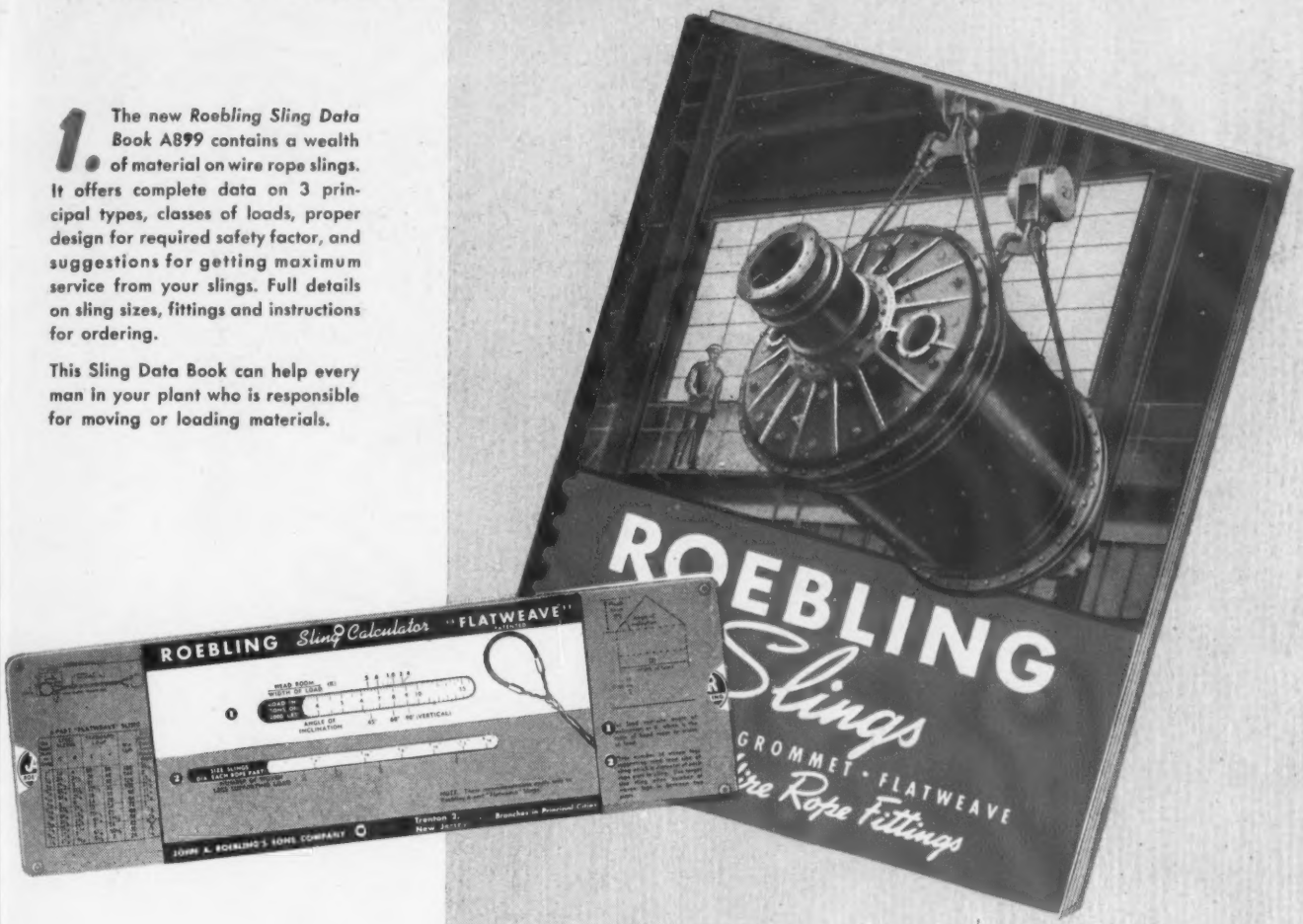
HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

VALUABLE *FREE* AIDS TO SELECTION AND USE OF CORRECT SIZE AND DESIGN OF SLINGS

1. The new *Roebling Sling Data Book* A899 contains a wealth of material on wire rope slings. It offers complete data on 3 principal types, classes of loads, proper design for required safety factor, and suggestions for getting maximum service from your slings. Full details on sling sizes, fittings and instructions for ordering.

This Sling Data Book can help every man in your plant who is responsible for moving or loading materials.



2. A handy *Sling Calculator* is yours for the asking. It enables you to determine quickly and surely the safe working load for your Roebling Slings on every class of lift. May be used for wire rope or "Flatweave" slings. The durable surface has full printed instructions for use as well as handy tables and diagrams which will help you get the most from your slings.

Roebling standard slings are available for general use, although many Roebling slings are designed to handle specific loads. Whether you require a standard or a special sling, your inquiry and order will receive the careful attention of Roebling engineers.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

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John A. Roebling's Sons Company
Dept. 202, Trenton 2, New Jersey

Gentlemen: Please send me without obligation:

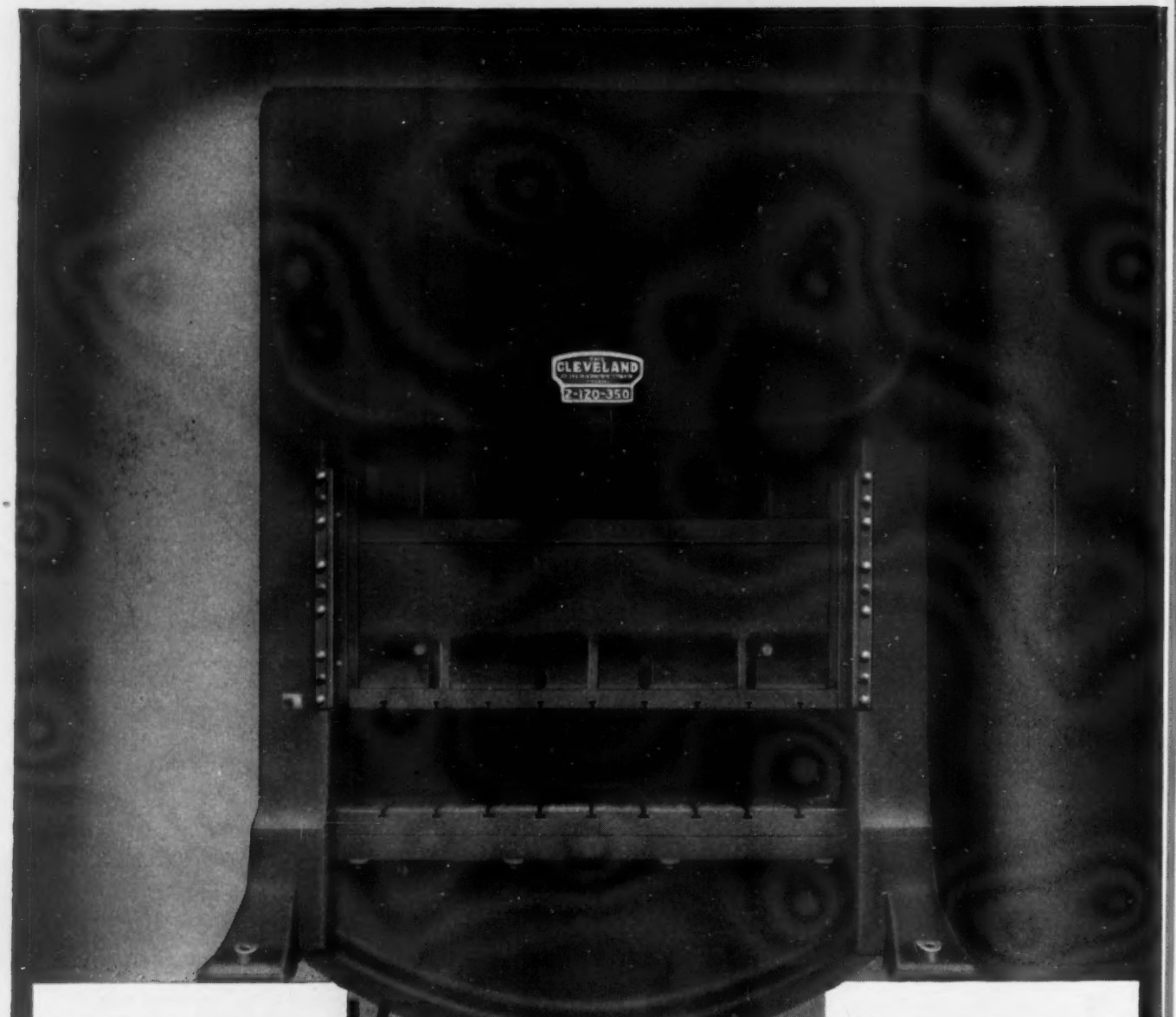
☐ Roebling Sling Data Book
☐ Roebling Sling Calculator

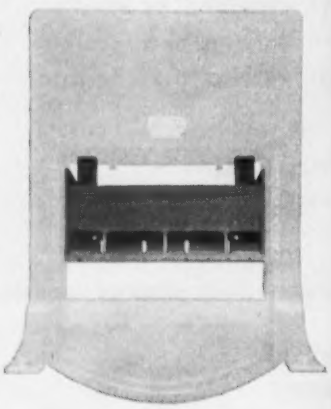
*Name*_____

*Address*_____

*Title*_____

*Company*_____





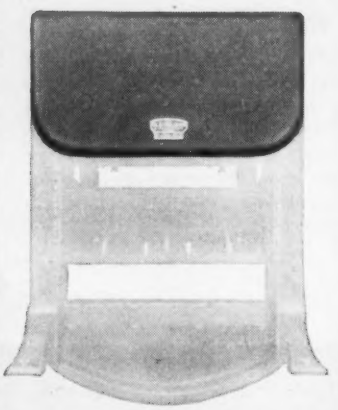
Modern Cleveland Two Point Presses have two connections — one at each side of the slide.

Modern 1 2 TWO POINT Presses

Except for the number of connections for the slide, all Modern Cleveland Presses are similar in design and construction.

The above illustration shows a Cleveland Two Point Press which is arranged with two connections, (as shown by the small engraving to the left) and this particular Press has a stroke of 10"; 8" adjustment; 30" shut height; 46" x 120" bed area; 350 tons capacity and operates at 15 strokes per minute.

Other Presses of this type are the Four Point, (having four connections) and the Single Point (having one connection) and each type can be furnished in a wide range of sizes and capacities to suit particular requirements.



The gears, flywheel and drive unit are located in the box type crown—with all gears running in oil.

The CLEVELAND PUNCH & SHEAR WORKS COMPANY. . Cleveland 14, Ohio

Branch Offices

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This book was written to help YOU

WORK STAINLESS STEEL

SEND FOR YOUR FREE *COPY TODAY!*

It already has helped thousands of manufacturers and fabricators. It can do the same for you—by taking the mystery out of working stainless steel.

This book tells frankly what you can do with stainless steel—and *HOW TO DO IT.* At the same time it tells what you cannot do—also lists the precautions you should take when working and handling stainless steel.

Here's a book that's worth real money to you—but it will cost you only the postage needed to write us for it. So get your copy NOW. Just ask for ENDURO Booklet No. 322-B.

REPUBLIC STEEL CORPORATION
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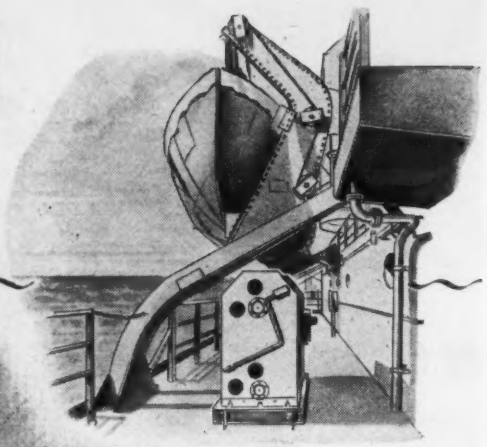
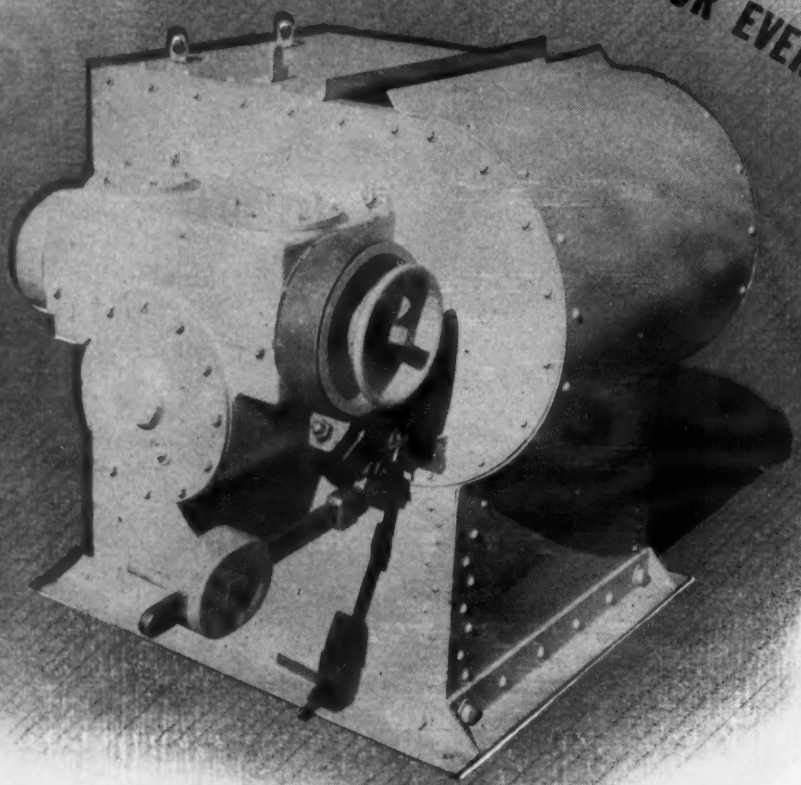
Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

43% lighter!



SAVES OVER A TON OF DECK WEIGHT FOR EVERY LIFEBOAT STATION



Welin lifeboat winch, made lighter with Alcoa Aluminum, is designed with a minimum factor of safety of six. Approved by U.S. Coast Guard.

It weighs only 2,845 pounds, compared to 5,000 pounds for an old-style winch—this newest addition to Welin Davit & Boat's line of "all-aluminum" lifesaving equipment. That's a ton of deck weight eliminated for every lifeboat station. Compensating ballast can be less, payloads higher.

IN YOUR PRODUCTS. As in that marine equipment, Alcoa Aluminum will give your products added utility value. Perhaps the weight you save translates itself into greater mobility, smoother and faster operation, lower costs.

Aluminum's ability to resist corrosive attack, and its resulting longer life, often opens new markets for your products. The many attractive, durable surface finishes possible with Alcoa Aluminum give added sales appeal.

To find out what aluminum will do for you, get in touch with the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 2112 Gulf Bldg., Pittsburgh 19, Pa.

ALCOA FIRST IN **ALUMINUM**

IN EVERY COMMERCIAL FORM

How Gisholt's

CROSS FEEDING TURRET

aves you time and money

● When you get down to close figuring, don't overlook the opportunity to cut costs with the Gisholt cross feeding hexagon turret — particularly on small lot jobs. You save in three ways:

1. By reducing tool investment
2. By reducing set-up
3. By reducing machining time

With simple tool holders, standard forged cutters and single point stub boring bars, you can face, bore, recess or thread the interior of a piece while the square turret is turning the outside. Or, with a taper attachment, you can handle taper and contour work.

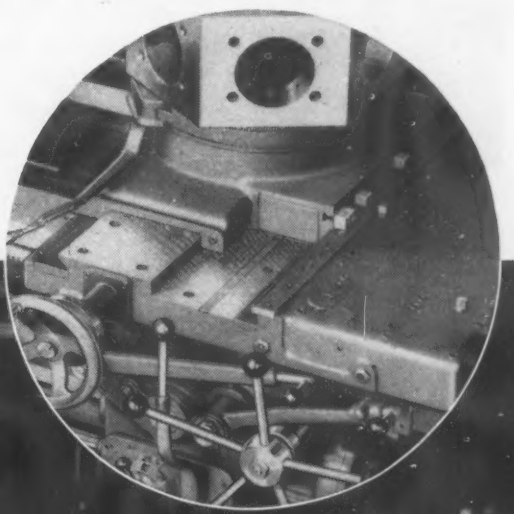
The cross feeding turret is available in all five sizes of Gisholt Saddle Type Turret Lathes. Ask for complete information.

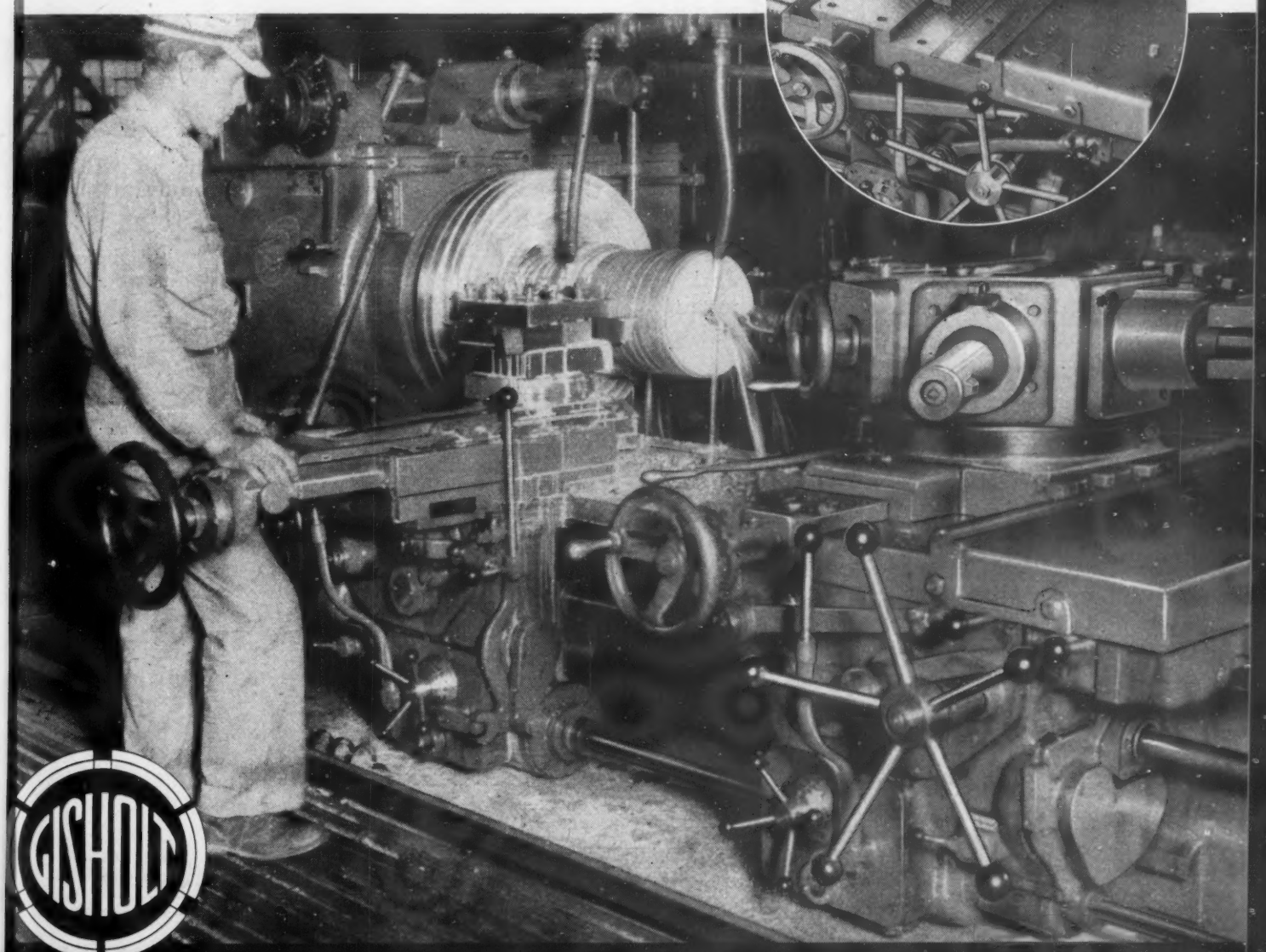
GISHOLT MACHINE COMPANY

1217 East Washington Ave. • Madison 3, Wis.

Look Ahead . . . Keep Ahead . . . with Gisholt

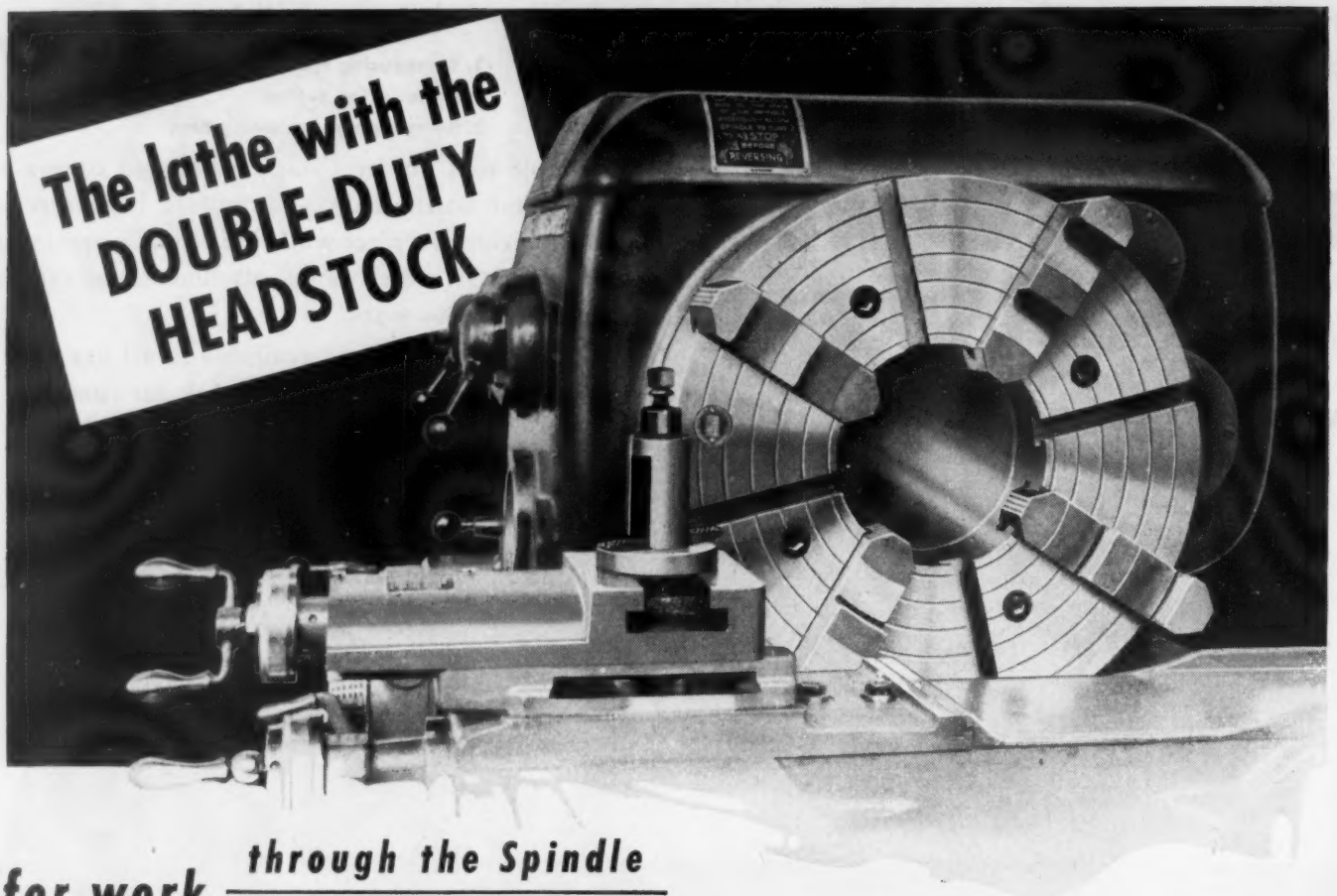
Permanent accuracy is assured with a slide base of hardened and ground steel plates and with dovetail and square lock construction. Cross feed micrometer dial and feed trips are provided. A positive stop with clamp permits locking the turret on center for conventional tooling on larger lot production. No feature of the fixed center machine is sacrificed.





GISHOLT

RRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

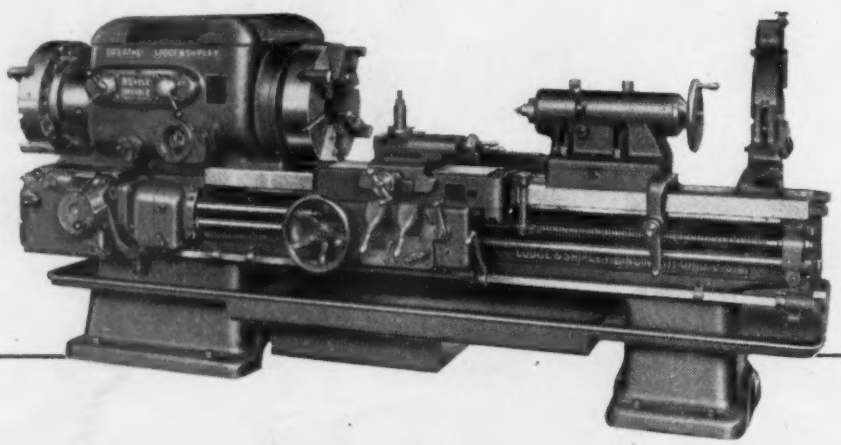


for work *through the Spindle* / *or between Centers*

● This Lodge and Shipley 20 inch Lathe with 8 9/16" hole through spindle has been developed for those jobs beyond the capacity of the standard lathe.

With headstock collet and center, the lathe can be used for regular between centers work . . . with headstock collet and center removed, work not to exceed 8 9/16" in diameter can be arranged through spindle, utilizing chucks at both ends.

You may have any number of jobs for which this lathe is the practical and economical answer. Why not call in Lodge and Shipley Engineers to discuss with you the suitability of this lathe for your work? There is no obligation. For additional details, write on your company letterhead for Bulletins 616 and 625.



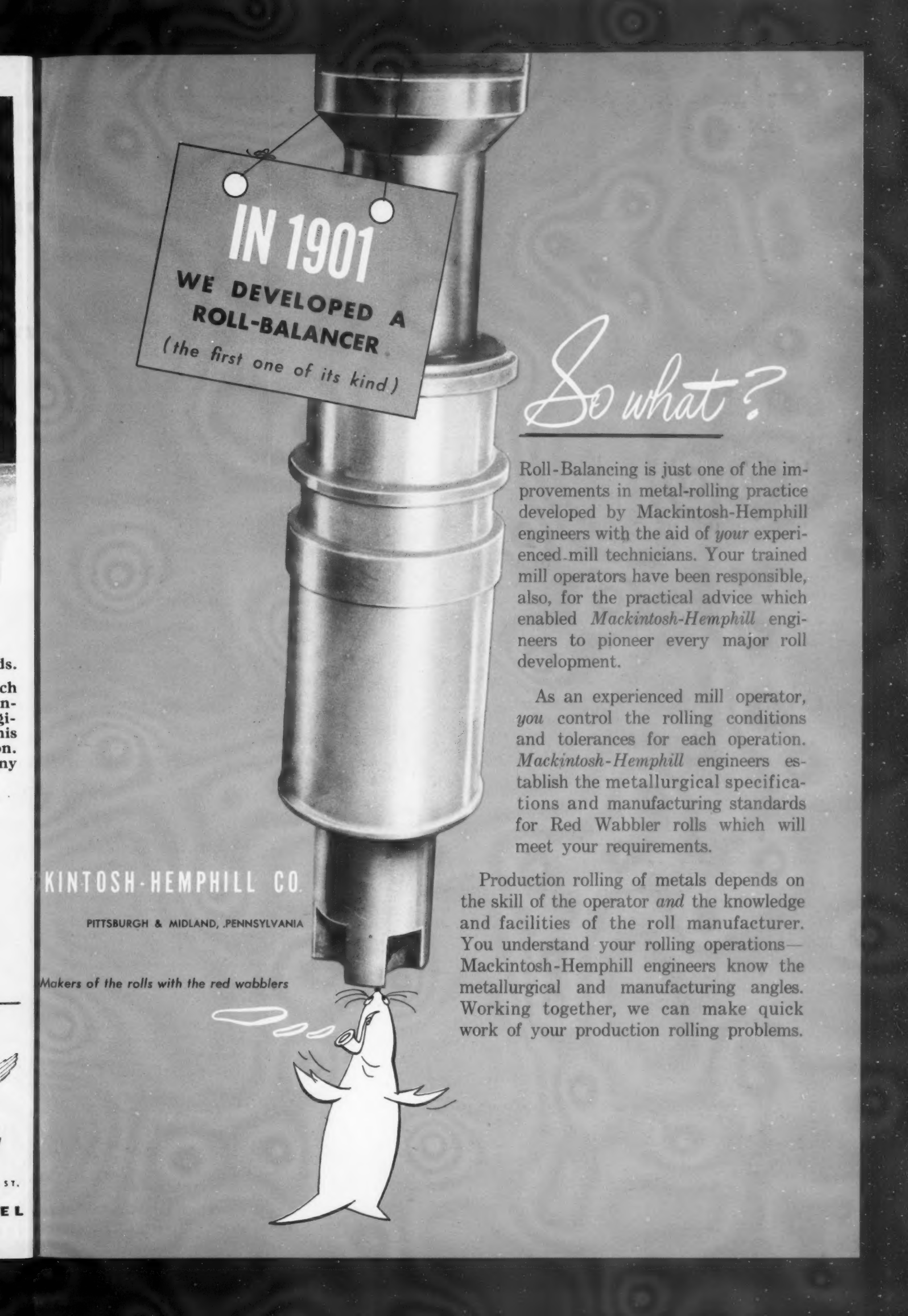
● *Illustrated is the 20" Hollow Spindle Lathe. Has all the features of the famous Lodge & Shipley Engine Lathe plus 8 9/16" Hole in Spindle. Other Hollow Spindle Lathes in 25, 27 and 30 inch sizes available with 12½" Hole in Spindle.*

ENGINE
TOOL ROOM
MANUFACTURING
OIL COUNTRY
DUOMATIC (AUTOMATIC) LATHES

THE LODGE & SHIPLEY MACHINE TOOL CO.

CINCINNATI 25, OHIO, U. S. A.

MACHINE TOOL DIVISION 3055 COLERAIN AVE. • SPECIAL PRODUCTS DIVISION 800 EVANS ST.



So what?

Roll-Balancing is just one of the improvements in metal-rolling practice developed by Mackintosh-Hemphill engineers with the aid of *your* experienced mill technicians. Your trained mill operators have been responsible, also, for the practical advice which enabled *Mackintosh-Hemphill* engineers to pioneer every major roll development.

As an experienced mill operator, *you* control the rolling conditions and tolerances for each operation. *Mackintosh-Hemphill* engineers establish the metallurgical specifications and manufacturing standards for Red Wabbler rolls which will meet your requirements.

Production rolling of metals depends on the skill of the operator *and* the knowledge and facilities of the roll manufacturer. You understand your rolling operations—Mackintosh-Hemphill engineers know the metallurgical and manufacturing angles. Working together, we can make quick work of your production rolling problems.

KINTOSH-HEMPHILL CO.

PITTSBURGH & MIDLAND, PENNSYLVANIA

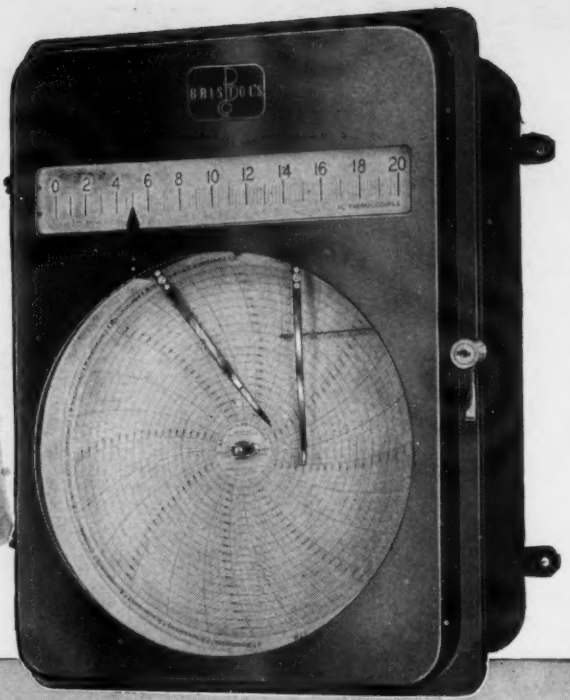
Makers of the rolls with the red wabblers

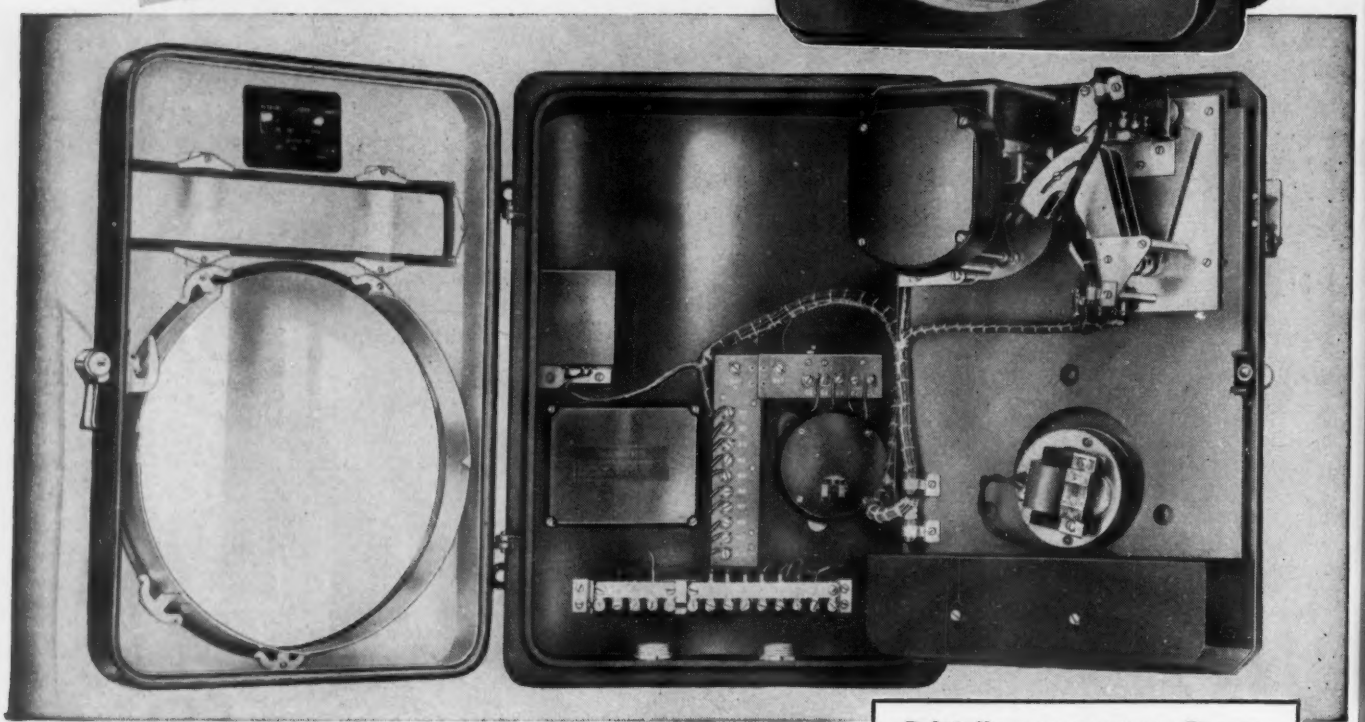
Bristol's PYROMASTER

A Self-balancing Potentiometer for Recording, Indicating and Controlling Industrial Processes

REDESIGNED EMBODYING NEW FEATURES

1. Hinged panel for accessibility.
2. Standard Cell for accuracy.
3. High-torque motor for ruggedness.
4. Totally enclosed relays and galvanometer.
5. Enclosed tarnish-resistant slide-wire.
6. Large easily read straight-line scale.





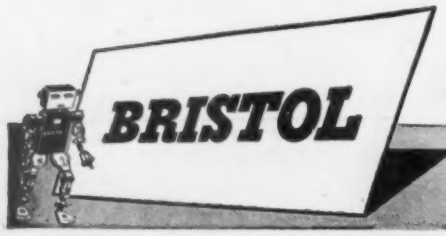
Pyromaster Pyrometer Electric-Type Controller, door open and panel swung out

ALL PARTS ACCESSIBLE: All parts of the Pyromaster are accessible even when the instrument is in full operation. The dial and recording mechanisms are mounted on the front of a hinged reinforced steel panel, which can be swung out of the case as shown above. The slide wire and potentiometer mechanism and, in the case of controllers, the control mechanism are mounted on the back of the panel. Each part or unit can be serviced in place or removed without disturbing any other part.

Complete facts in Bulletin P1200. Address 149 Bristol Road

Bristol's PYROMASTER Pyrometers are available in the following types of instruments for temperatures up to 3600° F.

Electric-Type Controllers, including Proportioning and Proportional Current-Input Control
Air-Operated Controllers
Single-Pen and Two-Pen Recorders
Dial Indicators
Time-Temperature Controllers
Radiation Pyrometers

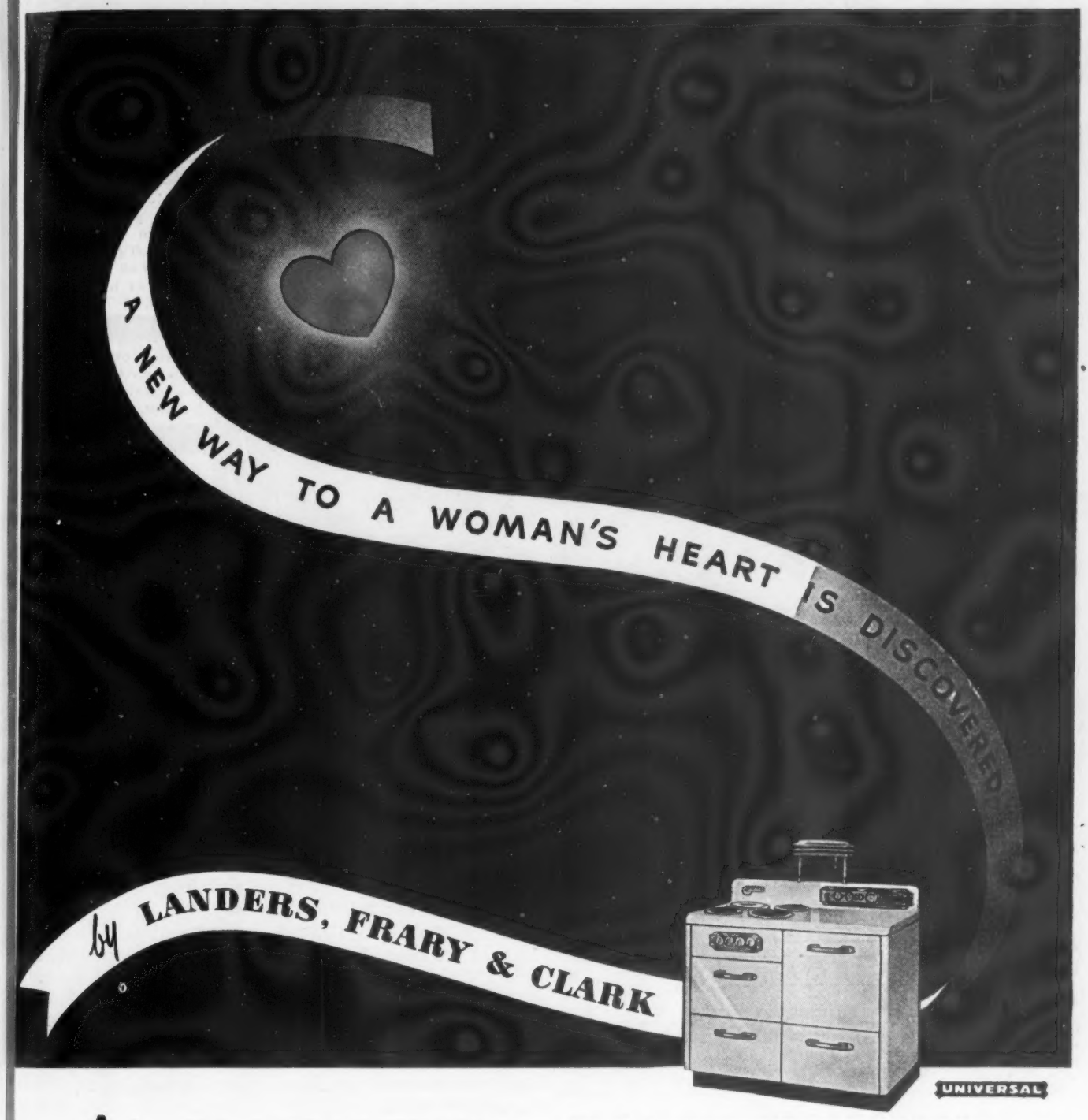


Engineers process control for better products and profits

THE BRISTOL COMPANY, Waterbury 91, Connecticut

The Bristol Co. of Canada, Ltd.
Toronto, Ontario

Bristol's Instrument Co., Ltd.
London, N. W. 10, England



Any woman's heart will yearn for one of the new, beautifully styled and enamelled "Universal" electric ranges made by Landers, Frary & Clark. Beneath the smooth, rich, glowing surface of that enamel is iron and steel which had to be clean as a whistle before coating and firing.

MANY REJECTS VS. "PERFECTION"

Under old methods of cleaning and pickling much of the work was rejected. Under a new method, developed with the help of a Pennsalt representative and Pennsalt products, the work was judged "perfect."

NO TANKS OR SOAKING . . . ALL SPRAY

In an enclosed unit, parts now move on an overhead conveyor; are never dipped. All cleaning, pickling and rinsing is done by sprays. Fumes are eliminated by a water wash. Pennsalt cleaners are used exclusively.

WHAT IS YOUR METAL CLEANING PROBLEM?

Pennsalt men have helped many manufacturers to turn out *better work—faster—at lower cost*—they may be able to help you. Write or wire to our Philadelphia headquarters and add our experience to your own.

PENN SALT

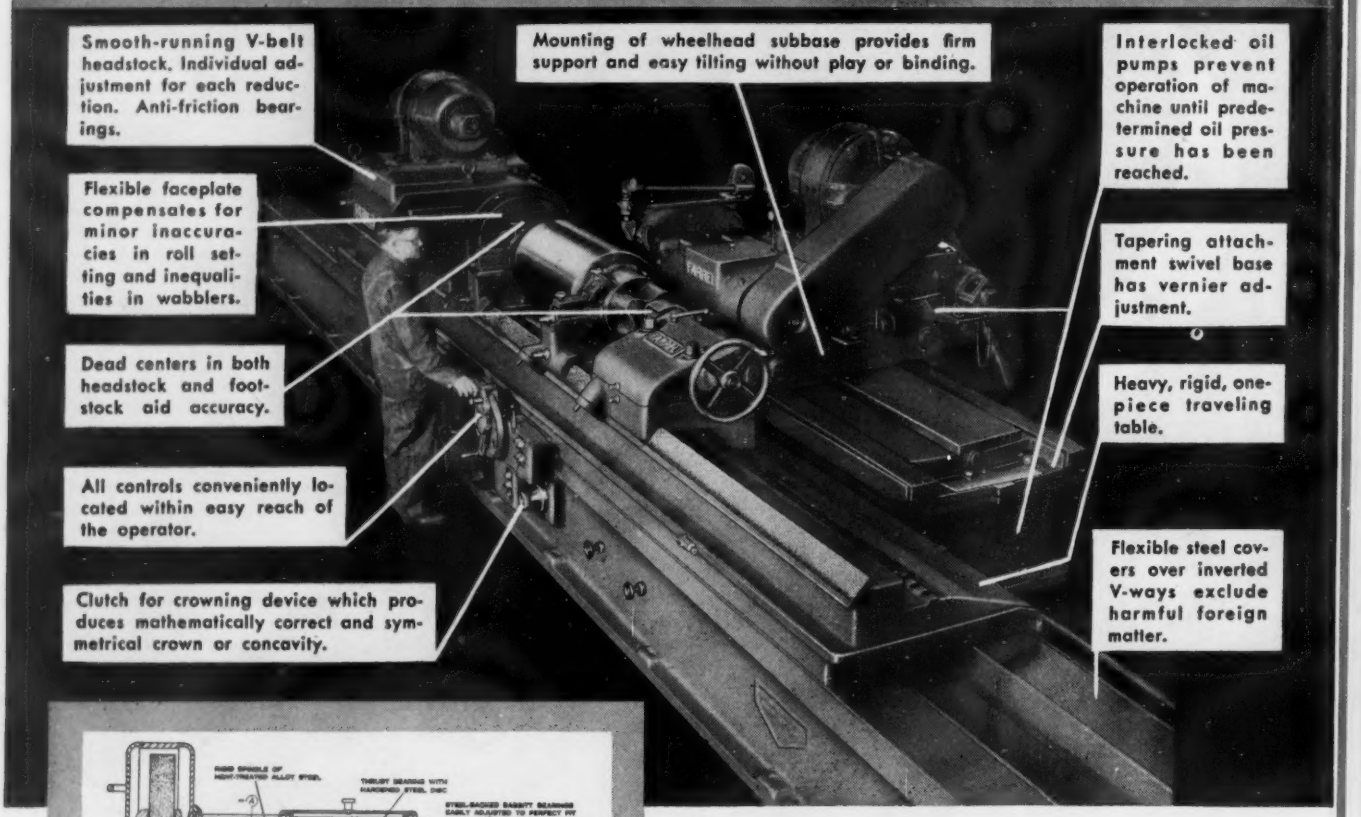
96 Years of Service to Industry

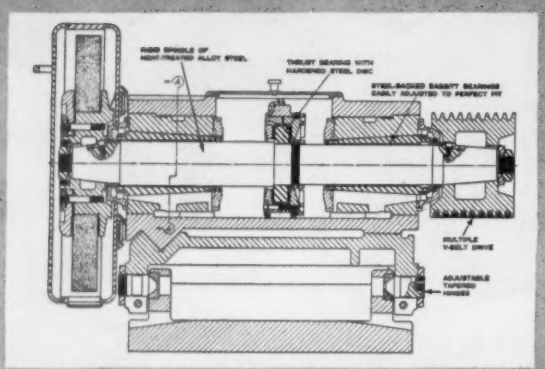
PENNSYLVANIA SALT MANUFACTURING COMPANY

Special Chemicals Division, 1000 Widener Building, Philadelphia 7, Pa.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • MINNEAPOLIS • WYANDOTTE • TACOMA

SOME REASONS FOR THIS ROLL GRINDER'S PRECISION PRODUCTION ABILITY


Smooth-running V-belt headstock. Individual adjustment for each reduction. Anti-friction bearings.
Flexible faceplate compensates for minor inaccuracies in roll setting and inequalities in wabblers.
Dead centers in both headstock and footstock aid accuracy.
All controls conveniently located within easy reach of the operator.
Clutch for crowning device which produces mathematically correct and symmetrical crown or concavity.
Mounting of wheelhead subbase provides firm support and easy tilting without play or binding.
Interlocked oil pumps prevent operation of machine until predetermined oil pressure has been reached.
Tapering attachment swivel base has vernier adjustment.
Heavy, rigid, one-piece traveling table.
Flexible steel covers over inverted V-ways exclude harmful foreign matter.



Thrust on grinding wheel spindle is taken by hardened steel disc and two babbitted rings at the center, which permit free expansion of spindle bearings.

. . . and what they give you

The performance-improving features that Farrel has engineered into this precision roll grinder give you four-way reduction in roll maintenance costs:

1. HIGH OUTPUT—The type TT roll grinder can be used for either heavy roughing or producing a high mirror finish. It is extremely fast on both types of work.

2. EASE OF SET-UP AND OPERATION — Many features contribute to ease of set-up and simplicity of operation.

3. HIGH ACCURACY—Design and construction promote and maintain precision in grinding straight, convex or concave rolls.

4. SIMPLIFIED TAPERING—When equipped with a tapering attachment, the machine will grind both roll necks and finish grind the body with the same setting of the roll.

The complete story, including sizes and capacities, of the type TT roll grinder is given in Bulletin No. 113. Send in the coupon for your copy.

FB-355

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, Stonington, New York, Akron, Pittsburgh, Chicago, Los Angeles, Tulsa, Houston, Charlotte

FARREL-BIRMINGHAM COMPANY, INC. (2.)
ANSONIA, CONN.

Please send me a copy of 32-page bulletin No. 113 describing Farrel Type TT Roll Grinders.

Name.....

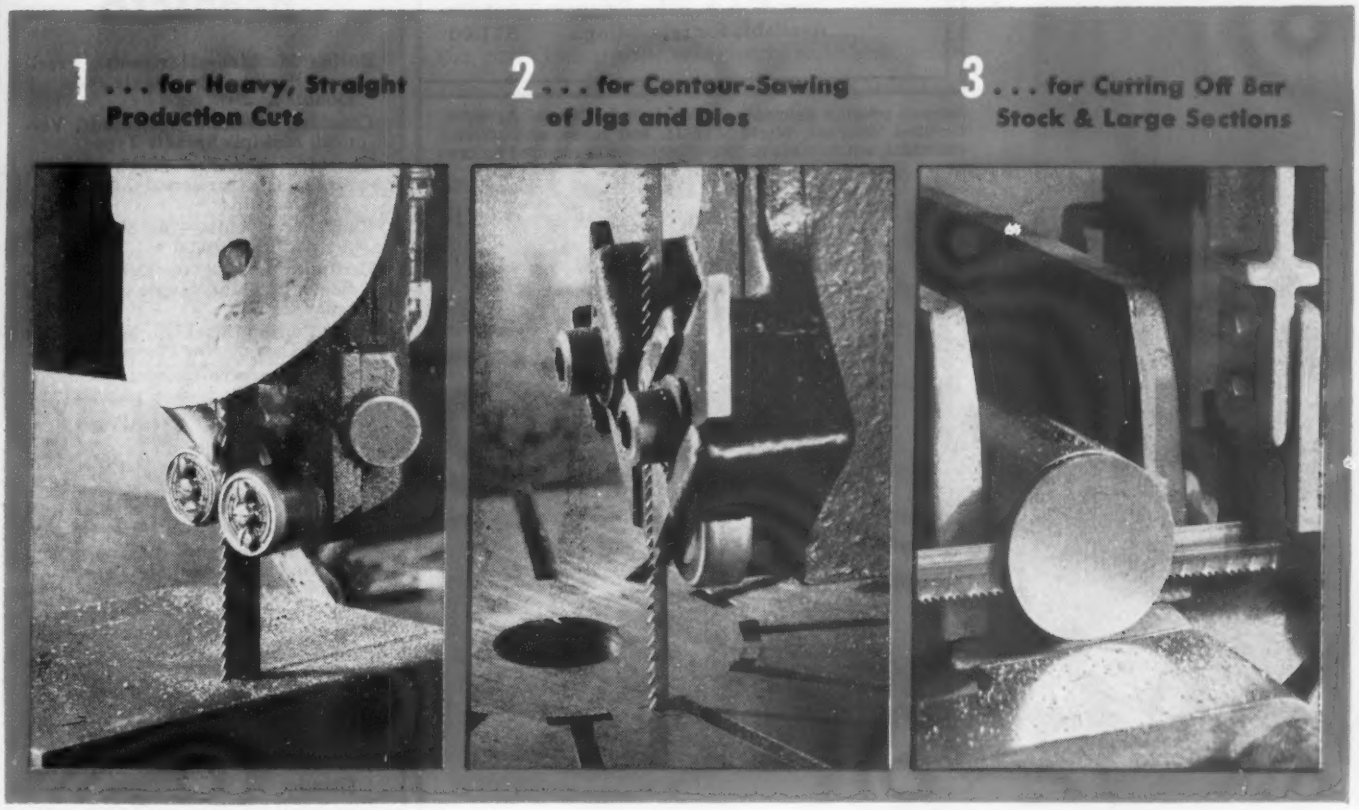
Company.....

Address.....

City.....State.....

Farrel-Birmingham

How
Small Shops and Big Plants
SAVE MACHINE-HOURS AND SPUR PRODUCTION
BY USING
SIMONDS METAL-CUTTING BAND SAWS



Set free your millers, shapers, lathes, broaches and drill presses *for their own work.* Use metal-band-sawing machines — and Simonds Hard Edge Band-saws — for the types of work shown above, and many other jobs.

Simonds Hard-Edge Metal-Cutting Bandsaws are made of special electric steel poured to Simonds' own specifications to stand the shocks and strains of this work *longer than any alloy steel.* Then, too, the rounded gullets and special tooth-set makes for smoother cutting and longer blade life on any of the jobs shown above — or any others. Ask your ISD for Simonds Hard-Edge Metal-Cutting Bandsaws . . . also for Spring-Temper and Skip-Tooth Bandsaws, if your needs warrant. Or call the nearest Simonds office listed at the right.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Other Divisions of SIMONDS SAW AND STEEL CO. making Quality Products for Industry

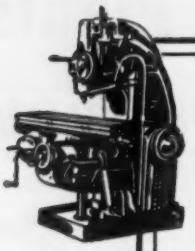
SIMONDS STEEL MILLS — SIMONDS SAW AND STEEL CO., LOCKPORT, N.Y. — *Special Electric Furnace Steels*

SIMONDS ABRASIVE CO. — PHILADELPHIA, PA. — *Grinding Wheels and Grains*

SIMONDS CANADA SAW CO. LTD. — MONTREAL TORONTO VANCOUVER SAINT JOHN, N.B. — *Simonds Products for Canada*

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Avenue, Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Wash. *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

. . . NOW 25% average



TYPICAL CASE—
MILLING MACHINE

Here is how War Assets Administration's new price has been set for a typical machine; Model 2K Kearney and Trecker Milling Machine, vertical knee action; War Assets Administration S.C. Code 3417-23-20-28.

Price (New).....	$7,054.00
Previous W.A.A. Sales Price (based on depreciation primarily).....	4,091.00
Average Market Value...	2,556.00
New W.A.A. Sales Price.	2,045.00
Available for rebuilding..	511.00

Sales to priority claimants, which include Federal Agencies, Certified Veterans, World War II, and subsequent priority claimants, will be made in proper sequence as required by law.

31 TYPES OF GENERAL PRODUCTION TOOLS REPRICED

- Boring Machine—Horizontal, Precision, Bridge Type, Single and Double End
- Chucking Machine—Automatic, Vertical, Multiple Spindle Type
- Chucking Machine—Single Spindle Automatic, Horizontal Turret Type Machine
- Chucking Machine—Six Spindle Automatic, Horizontal
- Drilling Machine or Drill Press—Bench or Floor, Single or Multiple Spindle
- Gear Cutting Machine for Straight Bevel Gears, (Not Planer Type)
- Gear Hobber—Horizontal
- Gear Hobber—Vertical, Universal
- Gear Shaper—For External Spur Gears Only
- Gear Shaper—For Spur Gears, External or Internal
- Gear Shaper—For Spur and Helical Gears, External and Internal
- Gear Tooth Shaver—For External and Internal Gears (Rotary Type Machine)
- Gear Tooth Grinder—Generating Type, for Spur and Helical Gears
- Gear Tooth Grinder—For Spur Gears, External and Internal (Formed Wheel Type Machine)
- Grinders—Centerless
- Grinder—Crank Pin Grinders
- Grinders—Plain External Cylindrical Grinder
- Grinder—Internal, Cylindrical, Automatic Sizing
- Grinder—Internal Cylindrical (Hydraulic Feed Machine)
- Grinder—Internal Cylindrical, Hydraulic Feed, for Hole and Face Grinding
- Grinder—Surface, Rotary Table Type
- Lathe—Multiple Tool, Not Automatic, Manufacturing Type Production Lathe
- Milling Machine—Automatic and Manufacturing Knee Type
- Milling Machine—Plain Bed Type, Horizontal Spindle Machines
- Milling Machine—Vertical, Knee Type (Not Including Bench Type)
- Polishing and Buffing Machine—Bench and Floor
- Profiling Machine—Vertical, Fixed Bed Type, Single and Multiple Spindle
- Tapping Machine—Vertical, Single or Multiple Spindle
- Thread Grinding Machines
- Thread Milling Machine
- Turret Lathe—Ram Type, Plain and Universal

MACHINE TOOL
SALES DIVISION

BELOW MARKET

NEW "FIXED PRICE" POLICY ESTABLISHED ON 31 TYPES OF SURPLUS MACHINE TOOLS

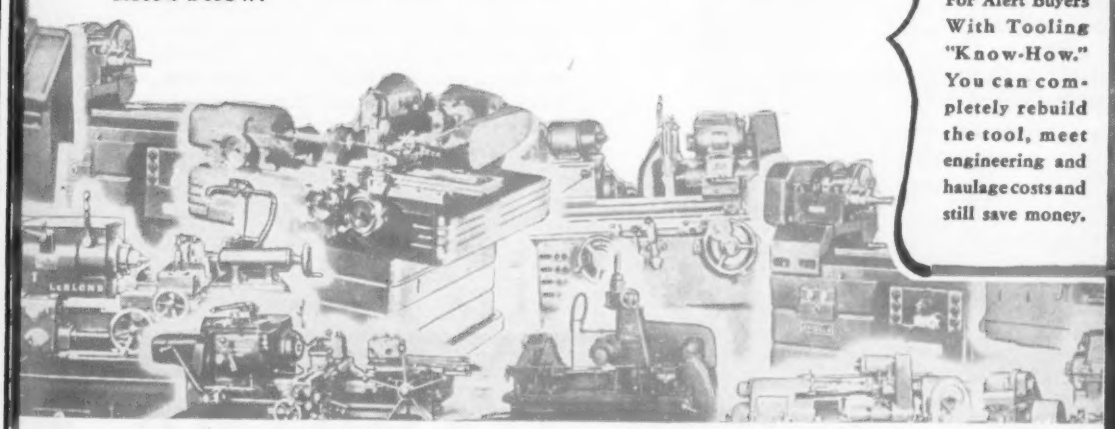
Here is good news indeed for the man who is trying to purchase general purpose production tools for replacement, reconversion or new enterprises. Now you can go into any of War Assets 33 Regional Offices, any machine tool site sale in the United States, or any approved War Assets Administration dealer and buy at the same fixed price, everywhere, the tools in these 31 groups listed at the left. No waiting for complicated figuring of prices, checks against priorities or other delaying factors. The tools are available in such quantity that your purchase can be cleared on the spot, and immediate delivery arranged.

But even more important is the principle under which the new low prices have been set. As the scale at the right indicates each price takes into consideration your costs of rebuilding the tool to new condition, engineering, service, etc. It is set well below the current market price for similar equipment sold on a full service basis. The differential is approximately 25% below market—enough for men with tooling "know-how" to realize a neat "extra" profit and at the same time acquire modern machine tools.

Plan now to check at once the detailed price and specifications list—now available in every War Assets Administration office (machine tool sales division) and the offices of your approved W.A.A. machine tool dealers.

FOR DETAILED PRICE CATALOG— *WRITE, WIRE OR PHONE:*

1. *Your Regular Machine Tool Dealer*
   War Assets Administration has appointed more than 3,000 "approved" dealers throughout the U. S.
2. *W.A.A. Machine Tool Sales Division*
   In any of the 33 War Assets Administration Regional Offices listed below.



686-1

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GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

W. A. A.'s NEW PRICING PRINCIPLE

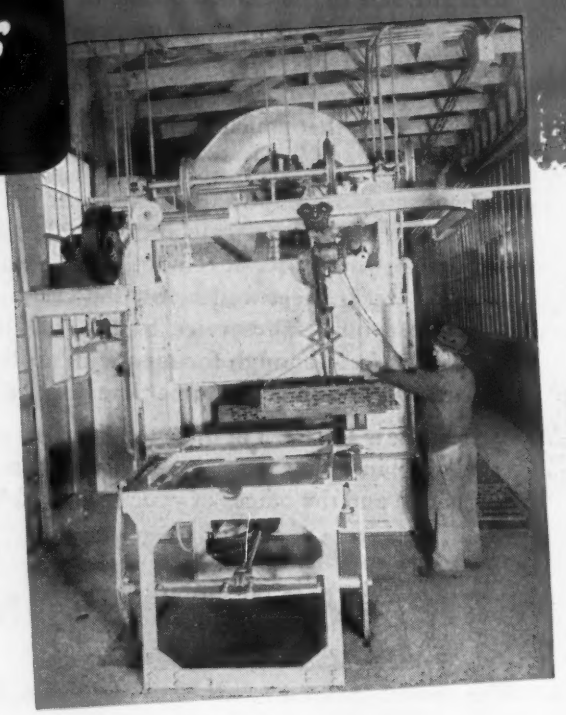
ORIGINAL COST
DEPRECIATION BASED PRIMARILY ON TIME
PREVIOUS W.A.A. PRICE
OBSOLESCENCE FACTORS
FULL SERVICE MARKET VALUE
EXTRA PROFIT AREA
For Alert Buyers With Tooling "Know-How." You can completely rebuild the tool, meet engineering and haulage costs and still save money.
ALLOWANCE FOR COMPLETE REBUILDING AND ENGINEERING SERVICE
NEW PRICE LEVEL

Building
INDUSTRIAL OVENS and FURNACES
for 53 years
. . has been our business

MAEHLER'S leadership in developing the recirculating air heat system for industrial ovens and furnaces has been recognized throughout industry for many years. The Paul Maehler Company has pioneered in this type of heating, the result of 53 years of experience which spans all of the methods from a coal stove in an oven serving bicycle refinishers to the complex systems of the present day.

Tests show that Maehler-engineered recirculating air-heat furnaces maintain temperature uniformity that is *virtually perfect!* This kind of temperature control assures the user of lower operating costs, greater production and more satisfactory results.

Regardless of what your requirements are . . . heat treating, core baking, enameling, etc. . . . Maehler engineers can help you design an oven, furnace or complete system to meet your needs.

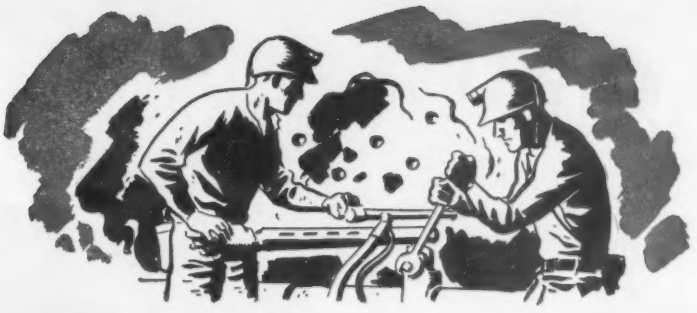


These two photos show typical Maehler installations. The one above is a Maehler air-draw furnace at Chambers, Bering Quinlan Co. It is used to anneal gray iron castings. The installation at the left is a Maehler continuous monoveyer core baking oven, with Palmer-Bee conveyor, at the Howard Foundry Company. The cores are baked 2½ hours at 450° F.

Industrial Ovens and Furnaces
for Core Baking, Mold Drying,
Heat Treating, Enameling etc.

MAEHLER

THE PAUL MAEHLER COMPANY
2208 W. Lake St. • Chicago 22, Ill.



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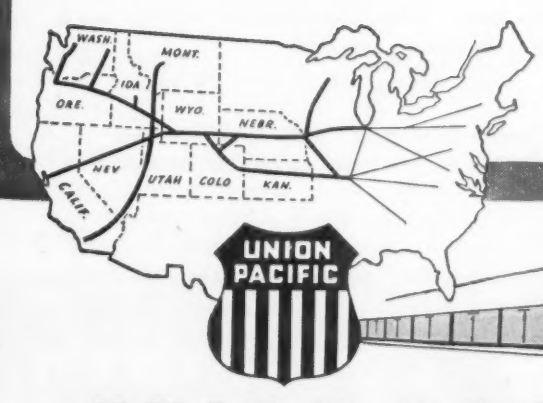

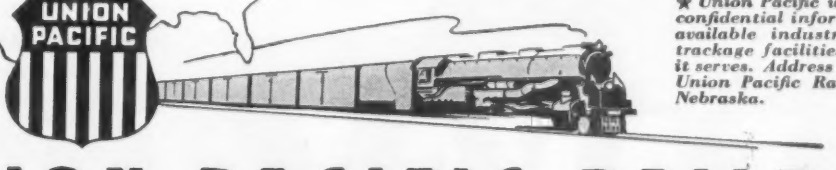

★ *Union Pacific will gladly furnish confidential information regarding available industrial sites having trackage facilities in the territory it serves. Address Industrial Dept., Union Pacific Railroad, Omaha 2, Nebraska.*

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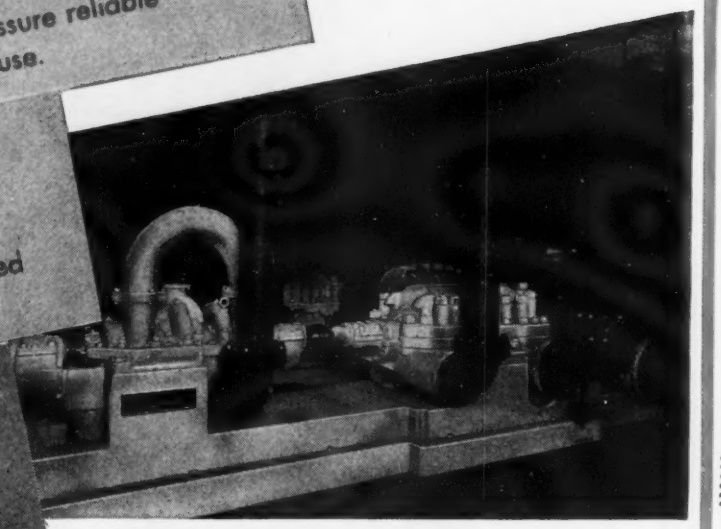
ECONOMY

particularly where steam also is required for heating or process.

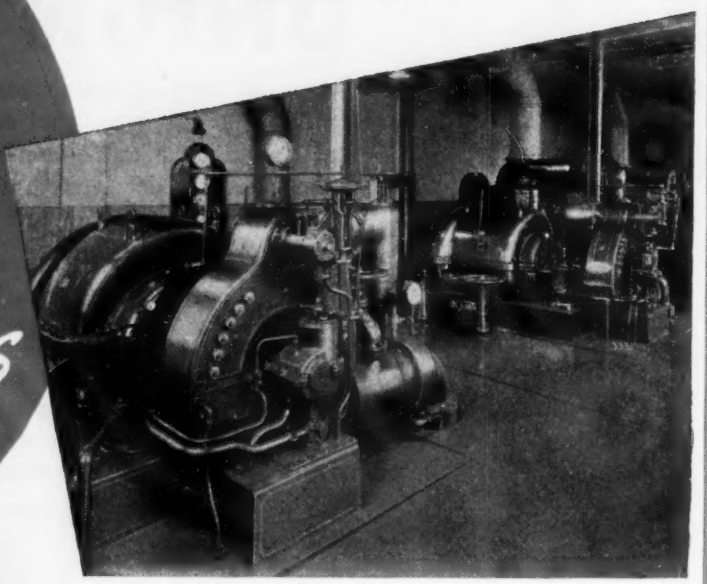
SPEED CONTROL

where close regulation and speed variation is desired.

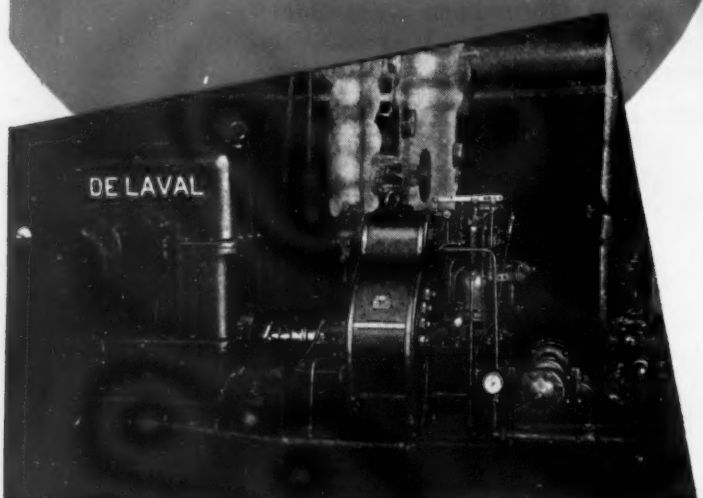


De Laval Class C Velocity Stage Turbine Driving De Laval Boiler Feed Pumps.

Install DE LAVAL SINGLE STAGE TURBINES



De Laval Centrifugal Compressor Driven by De Laval Velocity Stage Turbine. Exhaust Steam from the turbine is used in processes throughout the plant.



Paper Machine Driven by a 225 Horsepower De Laval Velocity Stage Turbine Through De Laval Worm Gear.

T-2

TURBINES · HELICAL GEARS · WORM GEAR SPEED REDUCERS · CENTRIFUGAL PUMPS · CENTRIFUGAL BLOWERS AND COMPRESSORS · IMO OIL PUMPS

DE LAVAL

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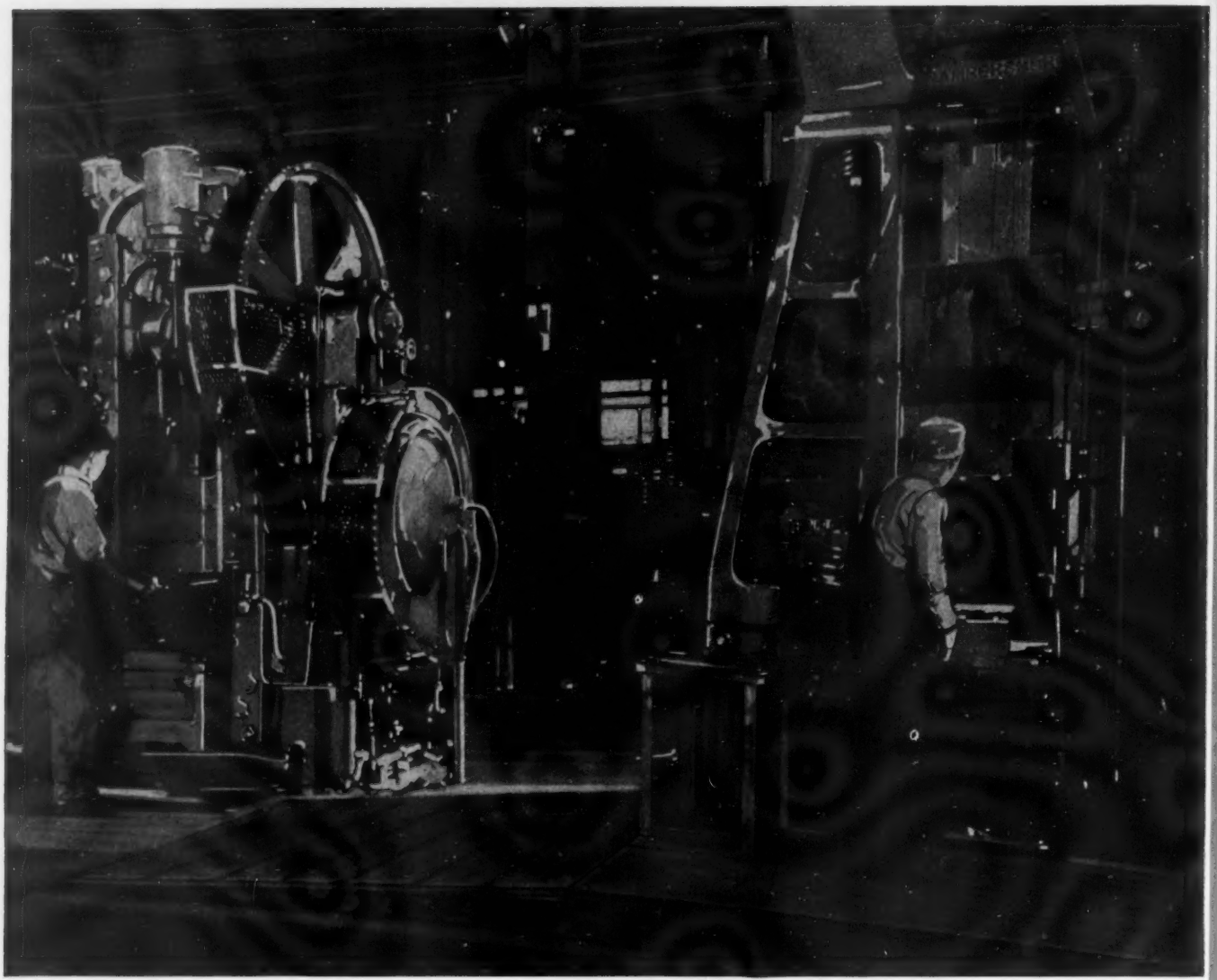

Photo courtesy Gardiner Mfg. Co., Oakland, Calif

The Ideal Combination – a Chambersburg Hammer and a Chambersburg Steel Side Trimming Press

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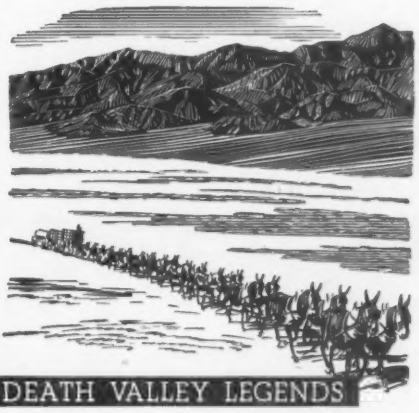
ONE OF A SERIES OF STORIES ABOUT ALLOYING METALS . . . WHERE THEY COME FROM AND HOW THEY ARE USED

THE STORY OF BORON

CENTURIES OLD

1 As long ago as the sixteenth century, records show that borax, a source of boron, was exported to Europe from Central Asia through Constantinople and Venice. The Persians called it "burah" from which we took our word "borax." Boron was isolated in 1808 by both Davy and Gay Lussac.



DEATH VALLEY LEGENDS

2 Formerly mined in Death Valley, borax was hauled great distances by the legendary twenty-mule teams under adverse conditions of rugged topography and intense heat. Known to the housewife as a cleansing agent, borax is also used industrially in soldering, welding, and the making of enamels.

ACTIVE WHEN HOT

3 Unaffected by air at ordinary temperatures, boron is nevertheless extremely reactive at high temperatures, particularly with the elements oxygen and nitrogen. That's why it is used as a deoxidizer and degasifier by the metal industry. It is also used to refine the grain of aluminum alloys.

MUCH FROM LITTLE

4 Boron improves the hardenability of steels; only a minute amount of boron is necessary to give the desired results. To avoid complete oxidation of this small quantity, the boron must be protected by other strong deoxidizers, or it must be added to a completely deoxidized bath.

HEAVY DUTY AGENT

5 Electromet produces "Silcaz" and "Silvaz" alloys, containing other strong deoxidizers that will protect the boron when added to the molten steel. Boron-treated steels are used for heavy machine parts such as gears and shafts. The presence of boron improves the quality of certain high-speed tool steels.

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Electromet supplies ferroboron, manganese-boron, nickel-boron, and the special boron-containing alloys, "Silcaz" and "Silvaz." Constant research by Electromet has continually developed newer and better alloys. An explanation of Electromet's service to users of ferro-alloys, and descriptions of Electromet's products are included in the booklet, "Electromet Ferro-Alloys and Metals." Write to our Technical Service Department today for a copy.

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"Silcaz" and "Silvaz" are trade-marks of Electro Metallurgical Company.

Electromet

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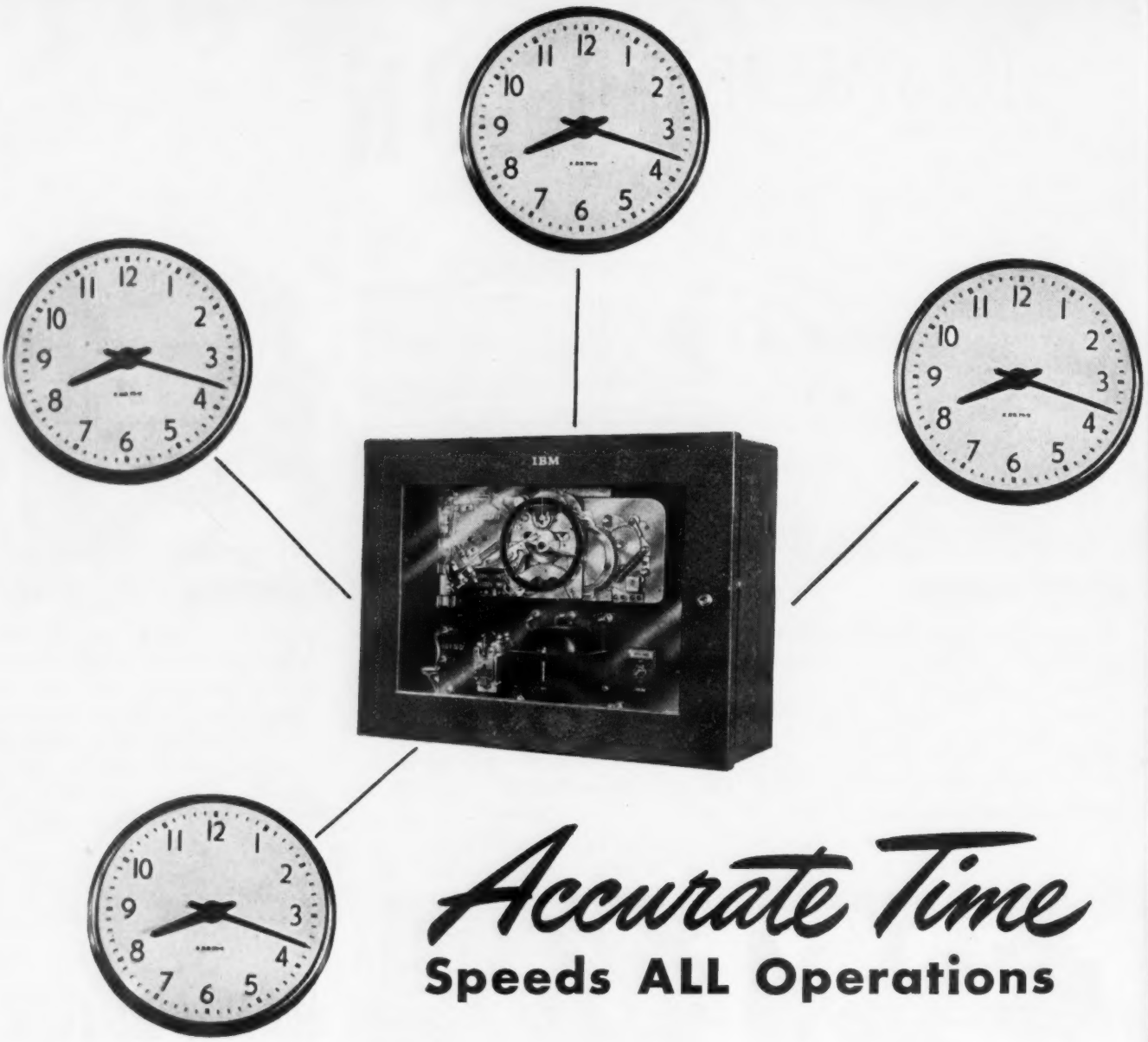

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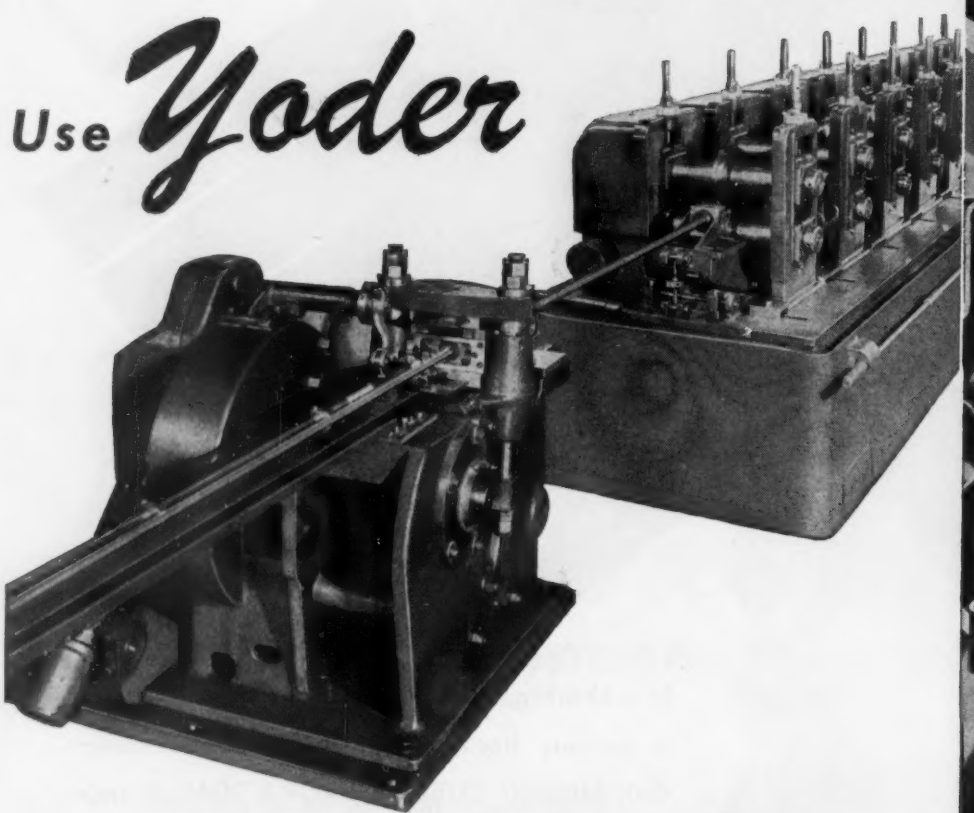

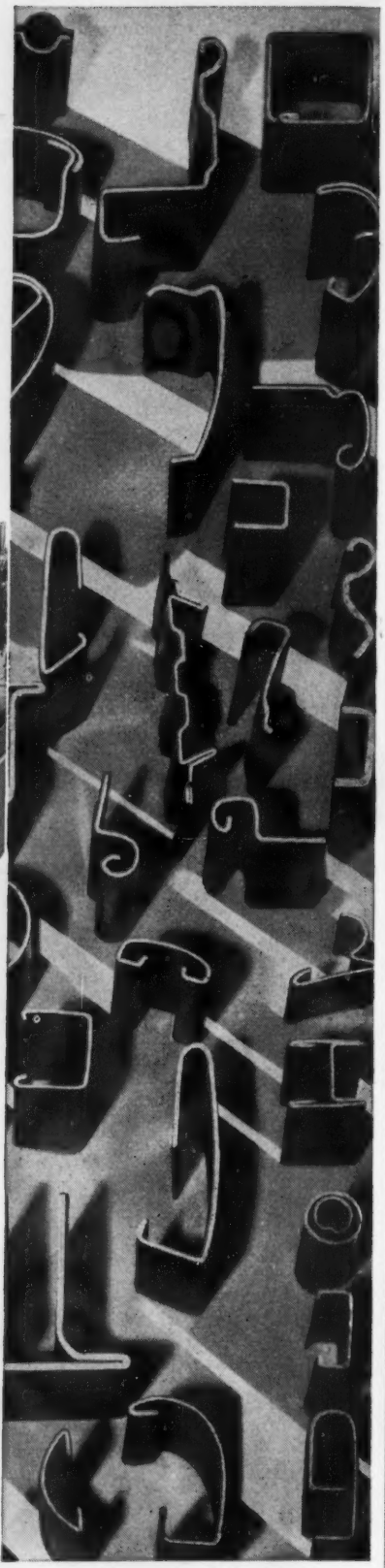

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Yoder makes many other varieties of special high production metal working machinery... fully described in Bulletin G-451.

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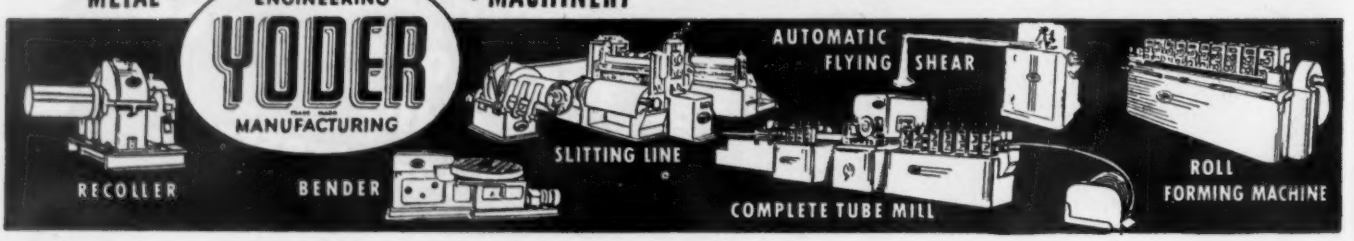
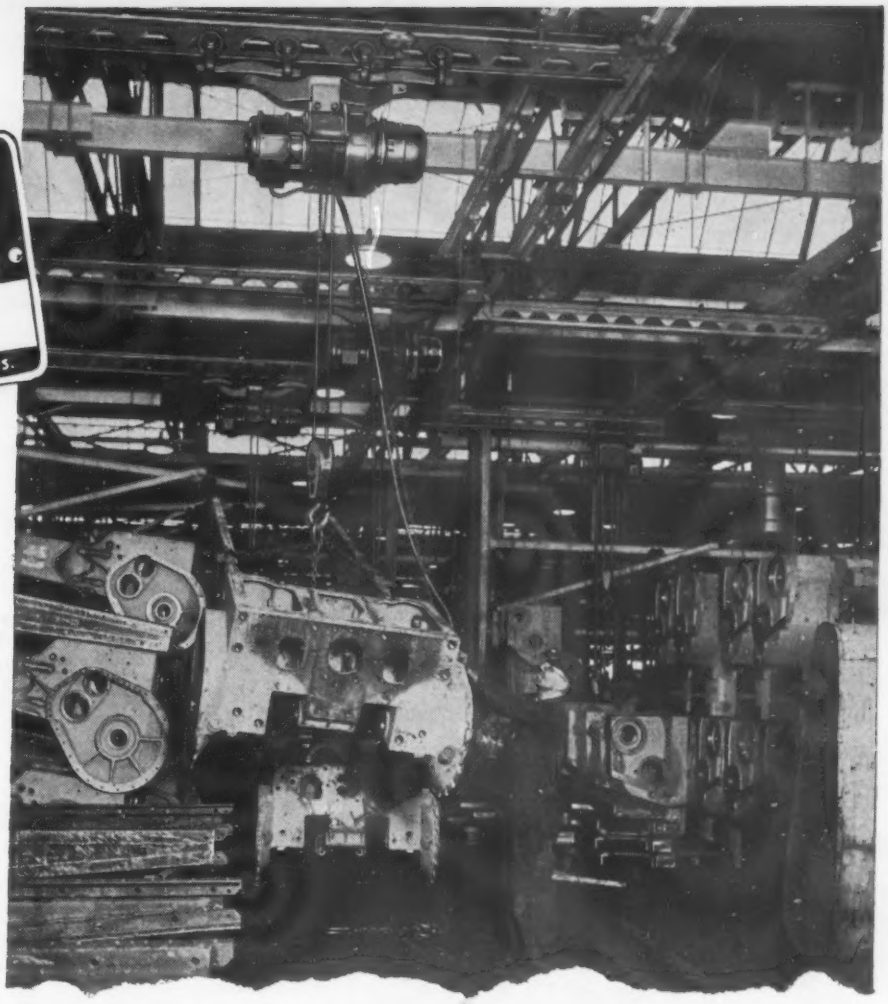


P&H HEVI-LIFT
HARNISCHFEGER CORP. MILWAUKEE, WIS.



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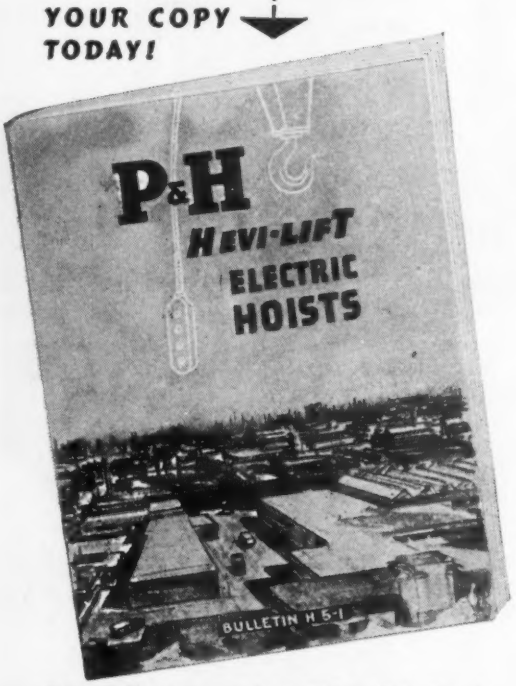

Bulletin H5-1 tells all about P&H Hevi-Lift Electric Hoists . . . where they're used . . . what kind of jobs they do. 50 pages of pictures and specifications. Get your free copy now!

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There's no waiting for results. Install a P&H Hevi-Lift Electric Hoist, and savings begin with the very first load!

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Yes, all these savings apply to *your* plant. For details on capacities and installations, call in a P&H Hoist Engineer — no cost or obligation.

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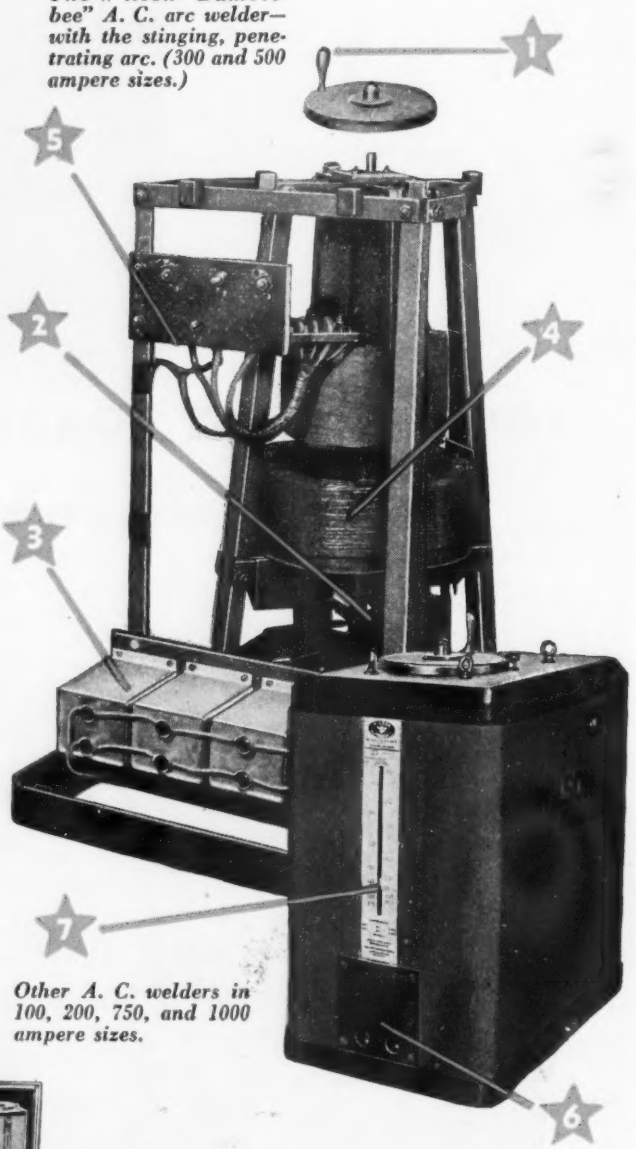
...Improved Weld Quality

7 reasons why your best bet for AC welding is a "Bumblebee"

Wilson "Bumblebee" A. C. arc welders provide quality welding faster, better, and at lower maintenance and operating costs. This is made possible by the incorporation of advanced principles of design in every "Bumblebee" welder — either regular or all-weather model:

1. *Precise, stepless current control* to any value within the NEMA range, simply by turning a crank on top.
2. *Efficient ventilation* provides safe, dependable operation even when operating at maximum current.
3. *Built-in capacitors* relieve over-loaded power lines and reduce power factor penalty charges.
4. *Coils protected against fire and vermin* by mica and glass fabric insulation.
5. *Interchangeable primary terminals* permit easy, rapid change from low to high line voltage and vice-versa.
6. *Output or secondary terminals readily accessible* by removing 4 screws which hold small insulating panel.
7. *High visibility of current indicator* is assured by large, easily read calibrated scale outside case.

The Wilson "Bumblebee" A. C. arc welder—with the stinging, penetrating arc. (300 and 500 ampere sizes.)



Other A. C. welders in 100, 200, 750, and 1000 ampere sizes.

5

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ADVANCED DESIGN FOR

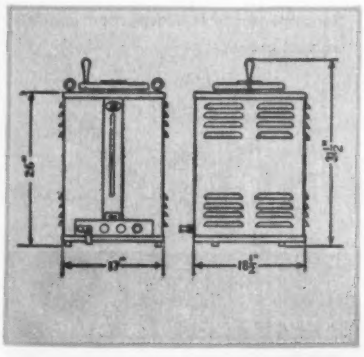
...Reduced Power Consumption

advanced design provides these operating features

In addition to the outstanding constructional features described and illustrated on the opposite page, the advanced design of the new Wilson "Bumblebee" offers other desirable qualities important to efficient economical welding performance:

1. WIDE CURRENT RANGE: from 30 to 275 amperes for the 200 ampere model; 60 to 375 amperes for the 300 ampere machine; and 100 to 625 amperes for the 500 ampere type.
2. IMPROVED ELECTRICAL EFFICIENCY at rated load of 84½%, 81% and 83%, respectively for the 200, 300, and 500 ampere sizes is provided.
3. LOW OPEN CIRCUIT VOLTAGE (75 volt) works to greater advantage on new AC electrodes and gives perfect ease of welding.
4. VASTLY IMPROVED POWER FACTOR virtually eliminates the penalty charge of low power factor at which transformers of earlier designs operated, and permits the use of smaller primary cables, line switches and fuses with a resultant saving on installation costs. This feature also permits the operation of more welders from existing feeders without causing overload, as compared with transformer welders of earlier designs or those without power factor correction.
5. QUIET OPERATION because there are no rotating parts in the circuit design. The Wilson "Bumblebee" is almost silent in operation.
6. MINIMUM MAINTENANCE because its operation involves no moving parts with the exception of the fan.

For more information about the complete line of "Bumblebee" A. C. welders, fill in the coupon on the left. Send it to: Air Reduction, General Offices, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas. Represented Internationally by Airco Export Corporation.



SPECIFICATIONS

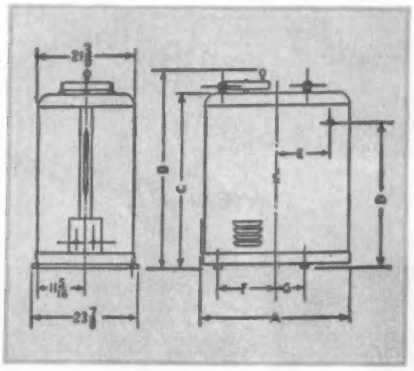
200 Ampere "Bumblebee"
(Shown on Left)

Approximate over-all dimensions on running gear height 37½", width 18½", length 18½"

300 & 500 Amp. Stand. & All-Weather "Bumblebees"
(Shown on Right)

	A	B	C	D	E	F	G
300 A	33"	42"	37"	31"	4"	12½"	6"
500 A.	36"	45"	40"	34"	5¼"	14"	7½"

Approx. dimensions on running gear	height	width	length
300 Amp.	52"	27"	46"
500 Amp.	55"	27"	46"



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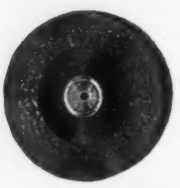
Carefully controlled distribution of the brushing stock gives perfect balance and maximum efficiency to these power driven rotary brushes. Wire or fiber. May be used as individual sections or in assemblies.

UNI-FILL

These scratch brushes are uniformly filled. They are trimmed with a "bite" to give the best performance obtainable with hand scratch brushes.



RED CENTER

Red Center Wheel brushes made in various diameters and degrees of stiffness for many different applications are sturdy in construction and in perfect balance.

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Headstock Faceplate Directly Driven by "Cone Worm" Gears

Advantages

1. **Operation at a Steady, Uniform Speed—"CHATTERLESS"**
2. **Cone Worm Drive Permits Compact Construction**
3. **Low Head Room—Facilitates Entry of Roll**
4. **Motors Protected by Headstock**
5. **Cone Worm Drive Rated Conservatively**

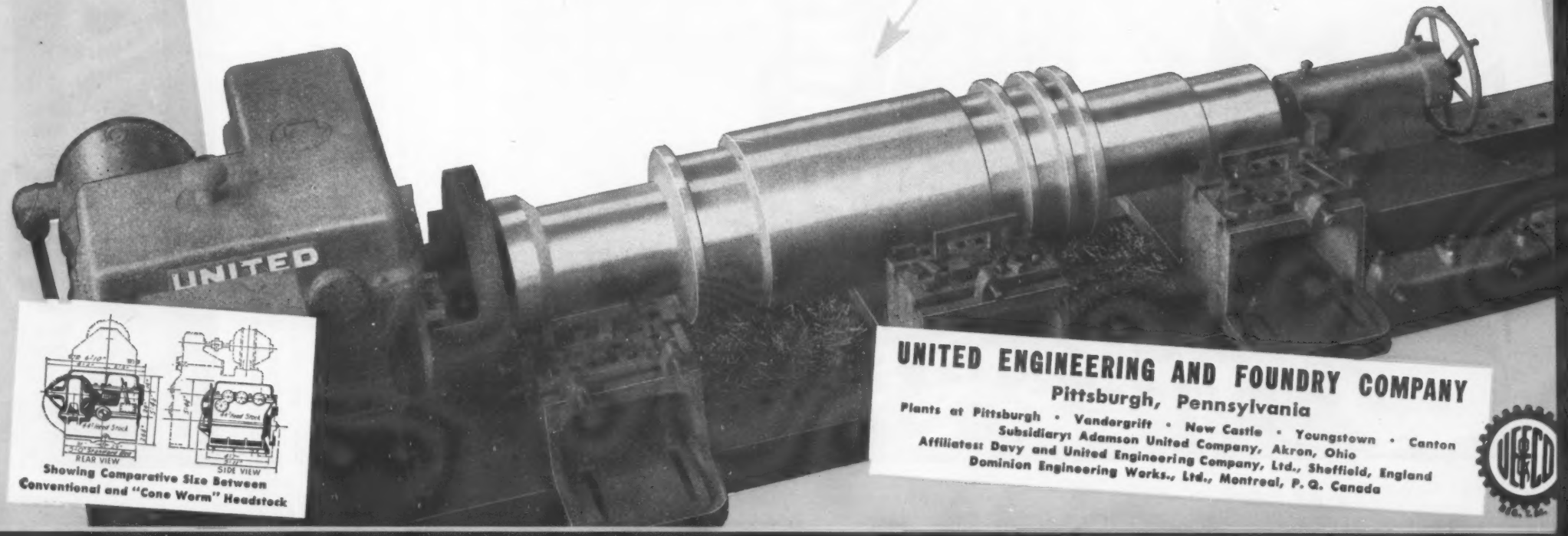
The "Cone" type of worm gearing used in UNITED HEAVY-DUTY ROLL LATHES, with its hour-glass shape of worm partially "wrapping" the gear and thus bringing more teeth in constant contact, provides maximum capacity in the smallest space, and chatterless operation. This superiority has been definitely established by test and experience in UNITED 4-high mill screwdown applications.

Low head room facilitates crane handling of rolls, and compact construction permits more floor space and visibility between lathes.

All gearing up to the main cone worm faceplate drive is either single or double helical, is fully roller bearing mounted and carefully proportioned with reference to both velocity and load requirements. These fully enclosed gears and bearings are lubricated by forced oil circulation.

UNITED HEAVY-DUTY ROLL LATHES can be furnished for either "fixed" or "rotating" center.

Consult UNITED engineers for full technical data.



Showing Comparative Size Between Conventional and "Cone Worm" Headstock

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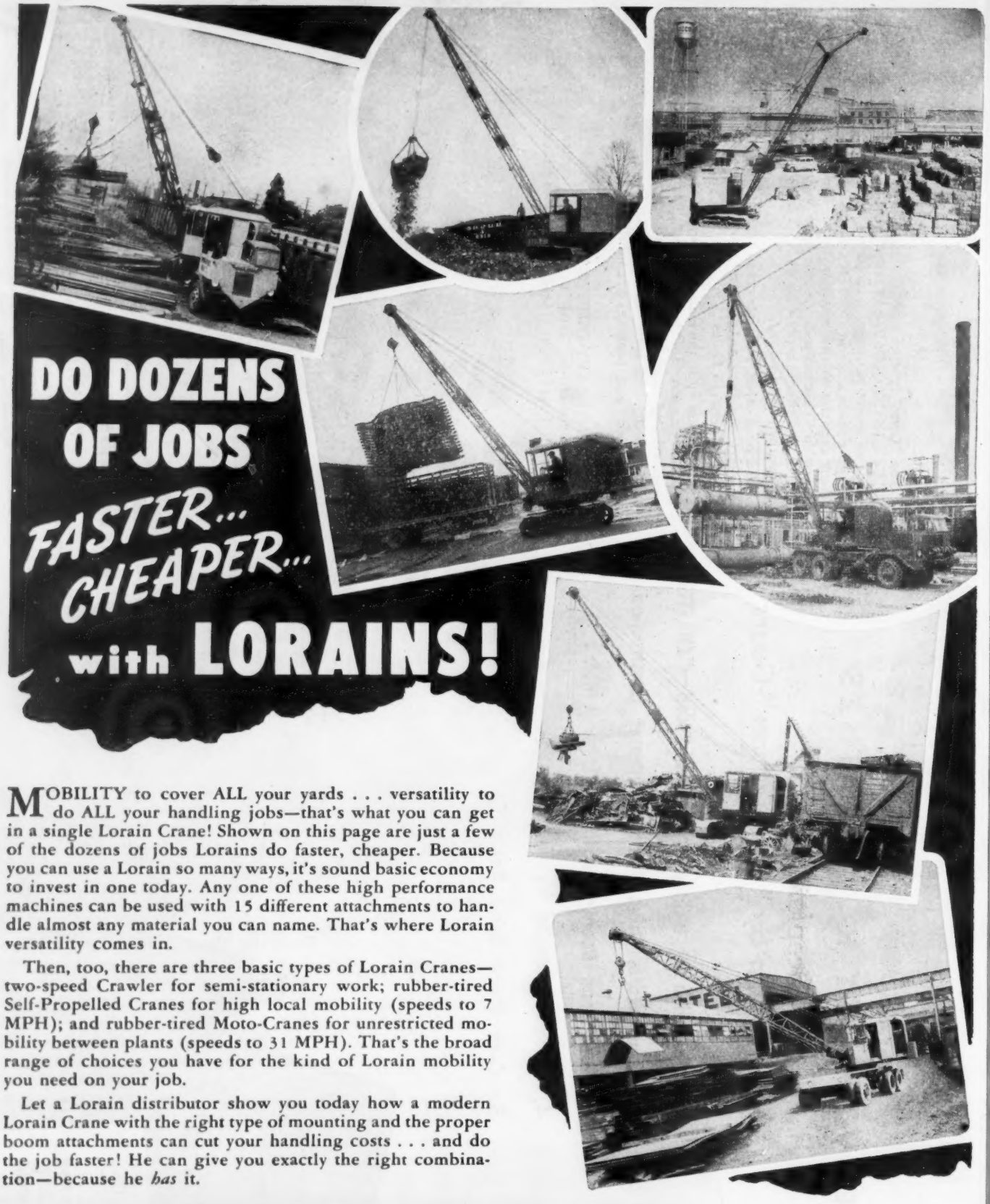
Dominion Engineering Works., Ltd., Montreal, P. Q. Canada



DO DOZENS OF JOBS *FASTER... CHEAPER...* with LORAINS!

MOBILITY to cover ALL your yards . . . versatility to do ALL your handling jobs—that's what you can get in a single Lorain Crane! Shown on this page are just a few of the dozens of jobs Lorains do faster, cheaper. Because you can use a Lorain so many ways, it's sound basic economy to invest in one today. Any one of these high performance machines can be used with 15 different attachments to handle almost any material you can name. That's where Lorain versatility comes in.

Then, too, there are three basic types of Lorain Cranes—two-speed Crawler for semi-stationary work; rubber-tired Self-Propelled Cranes for high local mobility (speeds to 7 MPH); and rubber-tired Moto-Cranes for unrestricted mobility between plants (speeds to 31 MPH). That's the broad range of choices you have for the kind of Lorain mobility you need on your job.

Let a Lorain distributor show you today how a modern Lorain Crane with the right type of mounting and the proper boom attachments can cut your handling costs . . . and do the job faster! He can give you exactly the right combination—because he *has* it.

Reg. Trade Mark

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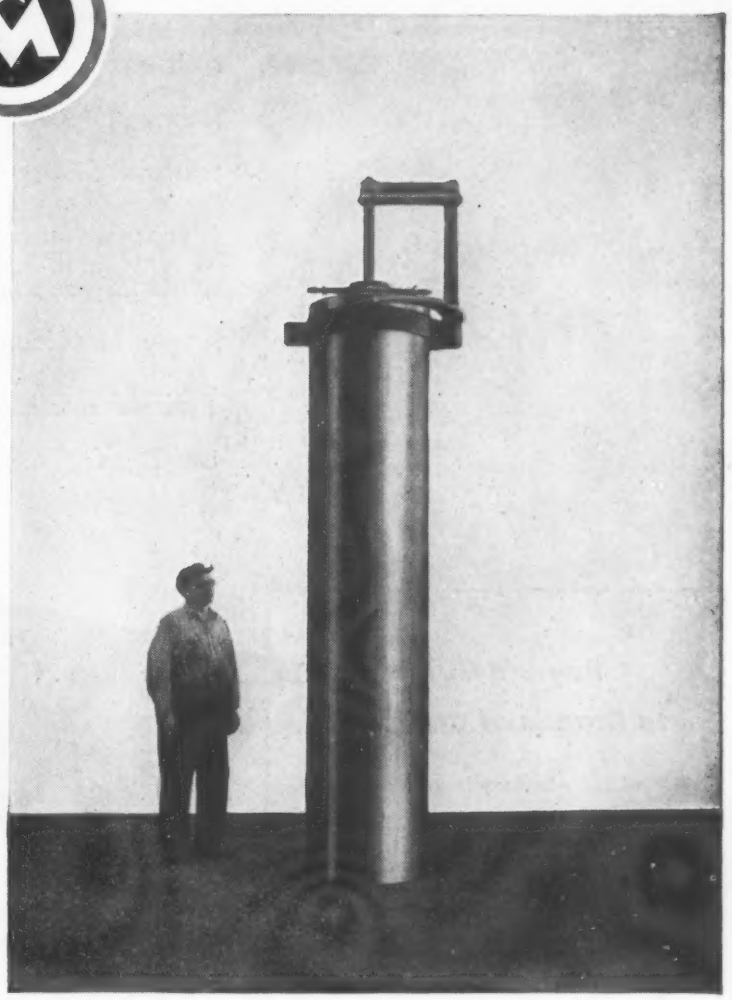

IF you are going to experiment with high temperature and high pressure with or without corrosion—modernize your existing plant or equipment—build a new plant for your pressure chemistry operation, Midvale has experience to offer you.

Pressure vessels by Midvale have made an outstanding record for long, safe life under the most severe operating conditions.

In achieving this record, we have learned much about engineering, forging, machining and heat-treating high pressure vessels.

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Custom Steel Makers to Industry

STAINLESS AND TOOL STEEL BARS
•
CORROSION AND HEAT RESISTING CASTINGS
•
FORGINGS AND RINGS

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HIGH SPEED STEELS

Whenever your cutting tools are operating under such severe conditions that a cobalt high speed steel is desirable, specify MO-MAX COBALT. It is available in four distinctive types, two with 5.00% cobalt and two with 8.00% cobalt.

If your regular sources cannot make prompt delivery on MO-MAX COBALT, we shall be glad to direct you to an available source of supply. In writing, please describe the proposed application.

Full information will be found in the MO-MAX Handbook. See Pages 27-28.

Buyer's Guide to Brands of MO-MAX

"LMW"	Allegheny Ludlum Steel Corp.
"MOHICAN"	Atlas Steels Limited
"BETHLEHEM HM"	Bethlehem Steel Co.
"MO-CUT"	Braeburn Alloy Steel Corp.
"STAR MAX"	Carpenter Steel Company
"MOLITE M-I"	Columbia Tool Steel Co.
"REX T-MO",	Crucible Steel Co. of America
"DI-MOL"	Henry Disston & Sons, Inc.
"HI-MO"	Firth-Sterling Steel Company
"REX T-MO"	Halcomb Steel Company
"MOGUL"	Jessop Steel Company
"TATMO"	Latrobe Electric Steel Co.
"MIDMAX"	The Midvale Co.
	St. Lawrence Alloys, Inc.
"S. T. M."	Simonds Saw & Steel Co.
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"8-N-2"	Vanadium-Alloys Steel Co.
"VUL-MO"	Vulcan Crucible Steel Co.

ONLY MO-MAX GIVES YOU *all* THESE ADVANTAGES

1. MO-MAX has superior cutting qualities. It is a happy combination of great toughness with high hardness.
2. The machinability of MO-MAX is unexcelled, particularly in grinding.
3. MO-MAX is economical. Its specific gravity is about 8% less than that of 18% tungsten steel. Thus for the same weight of high speed steel, 13 bars of MO-MAX are obtained as compared with 12 similar bars of an 18% tungsten steel.
4. In addition to the standard general-purpose composition of MO-MAX high speed steel, several special types have been developed for particular purposes. There are four with a high cobalt content, one high in vanadium and two that are especially suitable for hot die work.
5. MO-MAX was the first of the modern molybdenum high speed steels. For 13 years MO-MAX has demonstrated its superiority in cutting tools.

★ ★ ★

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A recently issued bulletin on Power Units giving complete engineering data on "packages of power" will be sent on request. Also available is a bulletin on Aircraft Quality Gears. Mail the coupon.

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You can *build up* savings all the way to delivery dock, using Elwell-Parkers engineered to your individual requirements — conventional Trucks and Cranes with suitable attachments, or original units engineered to your individual project—strips, sheet, plate, slab, or ingot.

Elwell-Parker's success in Steel is built upon years of cooperation with engineers throughout the industry — continually aiding with individual problems brought here for solution, gaining still broader experience for other Steel handling problems ahead. The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland 14, Ohio.

The maximum output of any machine is no greater than its system of supply.

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POWER INDUSTRIAL TRUCKS

Established 1893

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WHETHER you're designing for Stainless Steel, fabricating with Stainless or using Stainless in the equipment you operate, this book—just published—will give you practical, up-to-the-minute information that will save you time and money.

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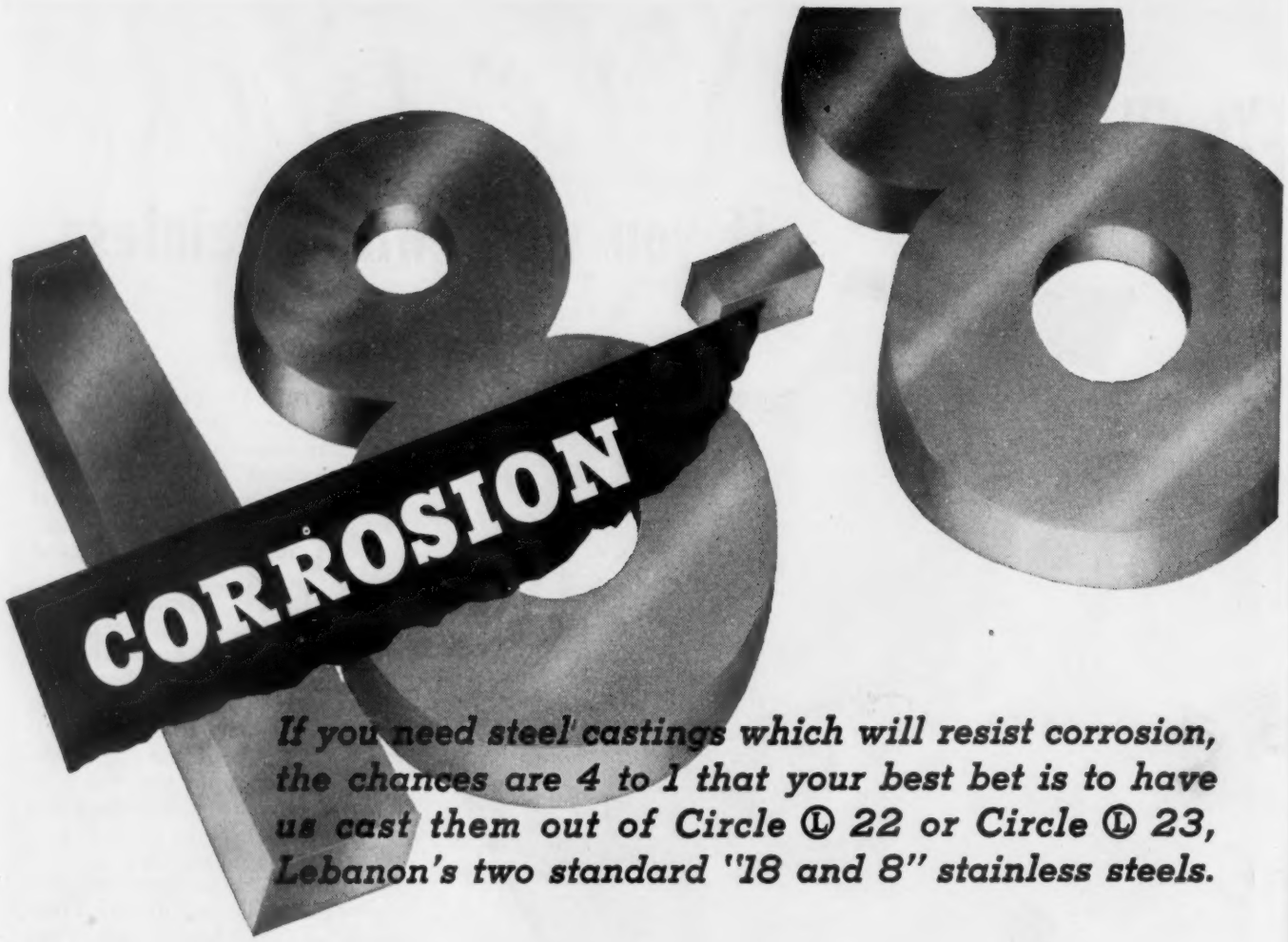
UNITED STATES STEEL



If you need steel castings which will resist corrosion, the chances are 4 to 1 that your best bet is to have us cast them out of Circle Ⓛ 22 or Circle Ⓛ 23, Lebanon's two standard "18 and 8" stainless steels.

20 YEARS ago Lebanon began producing electric furnace castings of the "18 and 8" stainless alloys. Since then, they have proved their value under such a wide variety of service conditions that they have become known as the workhorses of the corrosion resistant alloys. Today they represent about 75% of the production of the Lebanon Steel Foundry's alloy output. This in spite of the fact that Lebanon has constantly pioneered the way in developing new alloys for special conditions.

Circle Ⓛ 22 and 23 are identical in analysis except for a lower carbon content in the former which makes heat treatment after welding unnecessary. The normal analyses and physical properties of these two alloys are summarized below. For more complete information write for our technical bulletin.

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In The Lebanon Valley"

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

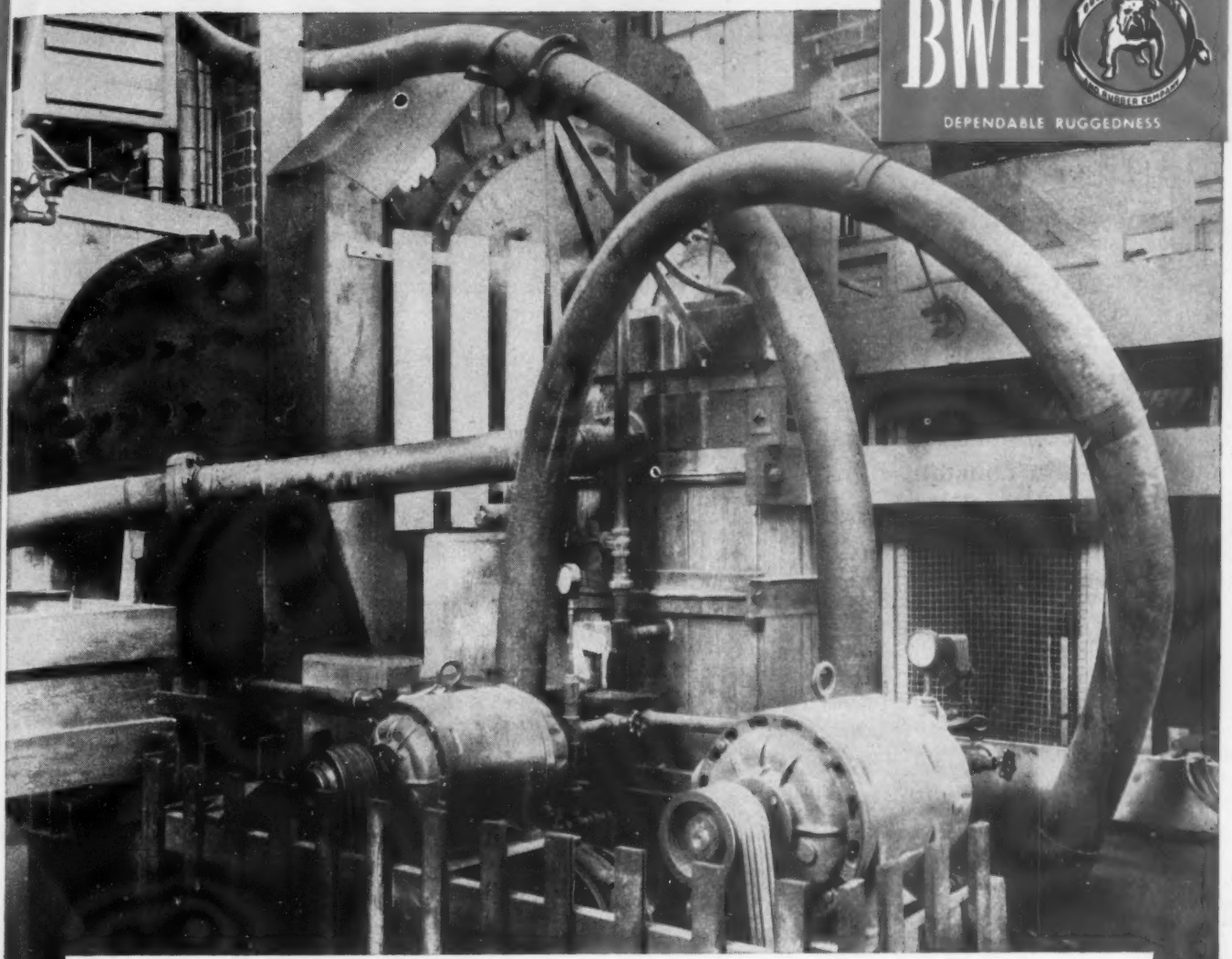
LEBANON CIRCLE Ⓛ 22 AND 23

Lebanon Designation	NOMINAL ANALYSES							NOMINAL PHYSICAL PROPERTIES			
	C.	Si.	Mn.	Cr.	Ni.	Mo.	Special	Tensile Strength	Yield Point	Elongation in 2"—%	Brinell Hardness
Ⓛ 22	0.07 Max.	1.25	0.75	19.50	9.00			75,000	36,000	50	135
Ⓛ 22-M	0.07 Max.	1.25	0.75	19.50	9.00		Se. 0.25	80,000	40,000	45	160
Ⓛ 22-XM	0.07 Max.	1.25	0.75	19.50	10.00	2.25		82,000	42,000	50	170
Ⓛ 23	0.20 Max.	1.25	0.75	19.50	9.00			75,000	36,000	45	140

Lebanon CIRCLE L **ALLOY AND STEEL Castings**

BWH

DEPENDABLE RUGGEDNESS



ROUGH CUSTOMER HANDLED SMOOTHLY BY

BWH ORE-HANDLING HOSE

To refine magnetite, it must be run through a series of hoppers that separate the ore from the waste sand. Carrying this heavy, highly abrasive ore to and from the hoppers requires hose that is highly flexible and has amazing durability. BWH solved the problem for a leading foundry with Bull Dog Ore Handling Hose.

This sturdy hose has multiple plies of heavy duck wound over a strong, one-inch-thick rubber lining. Beneath the two outer plies is a high tensile spiral wire imbedded in rubber. Spaced to give the hose maximum flexibility, the wire also adds strength and prevents kinking. Finally, a high-grade, wear-resistant protective rubber cover encloses tube and fabric. Fittings are of the outside sleeve type; thus no metal comes in contact with the abrasive ore . . . and service of the hose is indefinitely prolonged.

When you require this or other types of industrial rubber goods, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearby BWH distributor, or write direct to BWH.

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Houghton offers a complete range of drawing compounds to cover all needs

Here they are—the big six in Houghton's line-up of drawing compounds for 1946—ready to protect dies, maintain constant film between work and dies, and supply the controlled friction needed for accurate drawing of metals.

They're worthy descendants of a long line of "researched" Houghton products—all tried and proven in war production, and chosen from the many formulae developed over the years at industry's request.

Houghto-Draws are uniform, stable, non-corrosive, easily mixed with diluents, and readily removable after drawing. They are fully described in a new folder, "Drawing Compounds by Houghton," which is yours for the asking.

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HOUGHTO-DRAW 766 — Deep drawing compound containing 30% colloidal pigment of fine particle size; will not clog circulatory systems.

HOUGHTO-DRAW 463 —Heavy oil, E. P. treated but not sulphurized; non-staining, particularly for aluminum alloy drawing.

HOUGHTO-DRAW 431—Dark heavy oil for precision drawing. Contains high percentage of sulphur and E. P. additive.

HOUGHTO-DRAW 160—Highly pigmented compound for deep drawing. Extreme-pressure treated, contains sulphur.

HOUGHTO-DRAW 260—Dark E. P. treated and sulphurized oil for forming or shallow drawing, using circulatory systems.

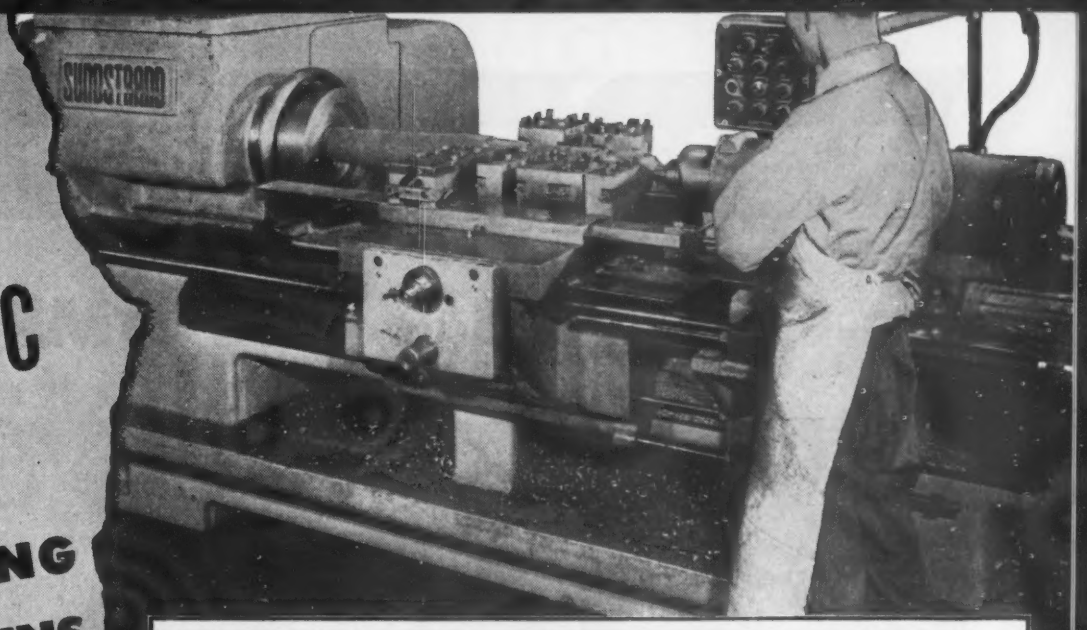
HOUGHTO-DRAW 360—For non-ferrous drawing and viscous enameling stock; contains no sulphur or pigment.

HOUGHTO-DRAW

NOW!

..a 75 H.P. AUTOMATIC LATHE

FOR BOTH LONG AND SHORT RUNS

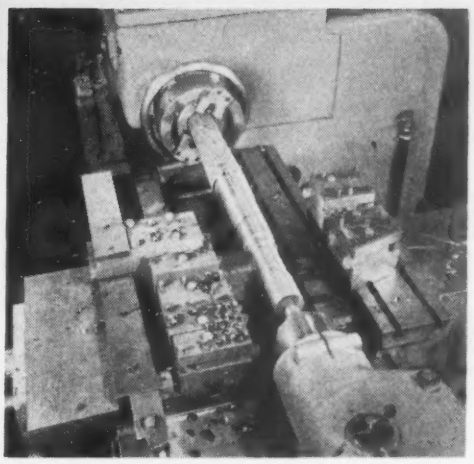


NEW MODEL 16 LATHE HAS ALL SUNDSTRAND LATHE FEATURES WITH 75 H.P. SPINDLE MOTOR . . .

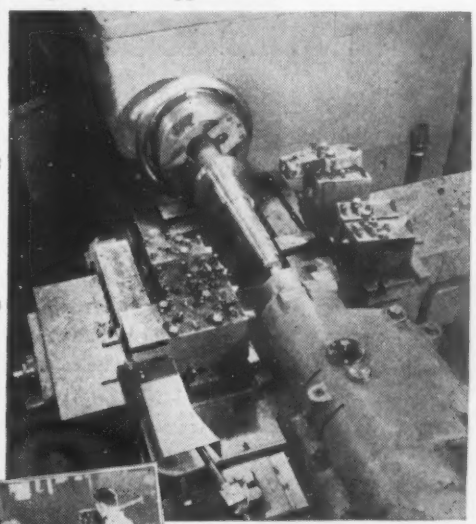
Yes, this new heavy duty lathe (17" swing over slides) has the same quick cycle change-over features as all other Sundstrand automatic lathes. It also has the same simplicity in adjustments, wide range of carriage cycles, wide range of feeds and speeds, high rapid traverse rate *and* a 75 horsepower spindle motor.

It handles large work as quickly and easily as smaller Sundstrand lathes.

If you have heavy turning jobs in long or short runs, or both, check into this highly productive automatic lathe. Its time saving capabilities can turn costly, cumbersome jobs into profitable ones.



Above—Rough turning one end of track sprocket shaft using 9 carbide tipped tools.
Below — Turning tractor steering clutch shaft using 8 carbide tipped tools.



PERFORMANCE

The following cutting data reveals powerful possibilities of this new machine:

●

PART — X-1335 Steel Billet 8" dia. x 40" long
SPEED — 190 RPM — 400 SFM
DEPTH OF CUT — 1"
FEED — .045 per rev.
METAL REMOVED — 183.8 cu. in./min.
HP CONSUMED — 111
RATIO OF HP TO METAL REMOVED — 1.65 cu. in. per HP
TOOL — T. C. Tipped

●

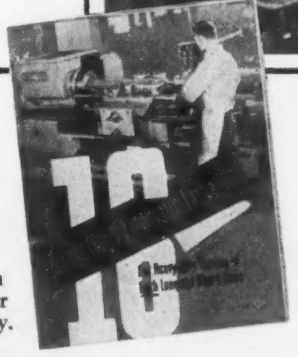
PART — Tractor Steering Clutch Shaft
MATERIAL — N. E. 8749 Steel Forging
HARDNESS — 285 Brinell
OPERATION — Rough Turn, Face and Form Long End
SPEED — 190 RPM (120 to 420 RPM Speed Range of Machine)
FEED — .38
METAL REMOVED — 18 pounds
HP CONSUMED — 79 (max. at peak load)
CYCLE TIME — 60 sec.
TOOLS — (8) T. C. Tipped

●

PART — Track Sprocket Shaft
MATERIAL — 1045 Steel Forging
HARDNESS — 212 Brinell
OPERATION — Rough Turn, Face and Form One End
SPEED — 229 RPM
FEED — .038 Front Slide, .015 Rear Slide
DEPTH OF CUT — Max. 7/8"
METAL REMOVED — 25 pounds
HP CONSUMED — 84 (max. at peak load)
CYCLE TIME — 75 sec.
TOOLS — (9) T. C. Tipped

FREE DATA coming off the press

This new booklet will give you specific data on the many outstanding features of this new heavy duty automatic lathe. Specifications, complete cycle data, and description of the Sundstrand quick cycle change-over are all included. Write for your copy today.
Ask for bulletin No. 755.



SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS, U.S.A.

SUNDSTRAND MACHINE TOOL COMPANY

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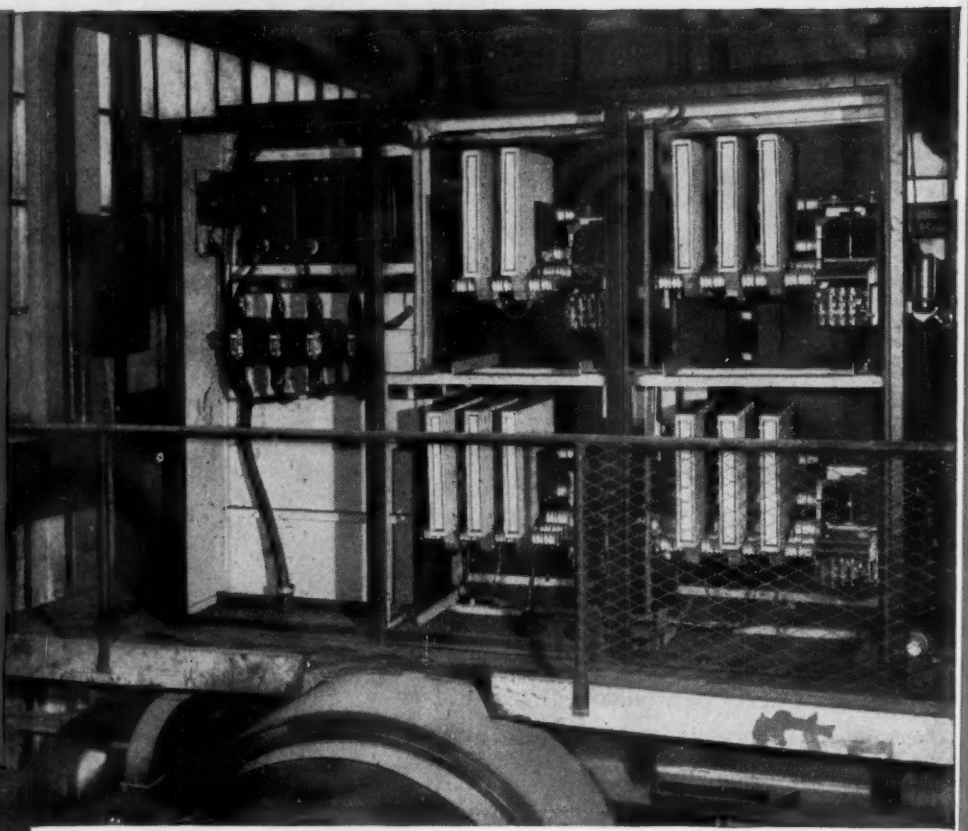
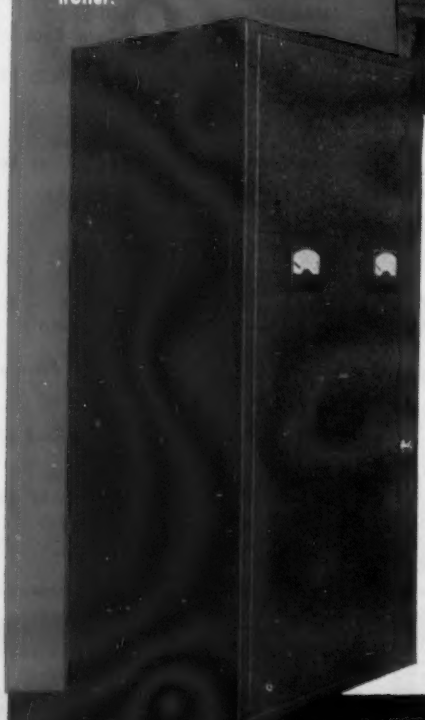
IT'S FAST IT'S TRIM IT'S RELIABLE

G-E High-voltage LIMITAMP CONTROL



This is the back view of a factory-assembled Limitamp unit. It controls the 300/600 hp synchronous motor which drives a Banberry mixer in a rubber mill. This mill represents only one of the many different industries for which Limitamp Control, designed for severe duty, is ideally suited.

This attractive, easy-to-install unit is a single Limitamp controller.



Here is a co-ordinated control that provides *outstanding* protection for high-voltage motors.

EJ-2 FUSES cut off a rise in current, resulting from a short circuit, in less than *one-quarter cycle* and clear it in less than one-half cycle—long before the short has time to harm the contactor or motor. And this operation takes place silently—without startling workmen.

AIRBREAK CONTACTORS designed for severe repetitive service, are co-ordinated with the EJ-2 fuses. These contactors give dependable, low-cost operation with little maintenance. Operating experience has proved that they furnish reliable service with only routine inspection—*even after several million operations.*

PROVIDING OVERLOAD AND UNDERVOLTAGE PROTECTION, this control guards the motor against overheating due to sustained overloads or single phasing by isothermic overload relays which are accurately calibrated against actual motor characteristics.

YOU'LL WANT complete details about Limitamp controllers—special features, different types of enclosures, ratings, etc. Ask our local office for Bulletin GEA-4247 or write directly to *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

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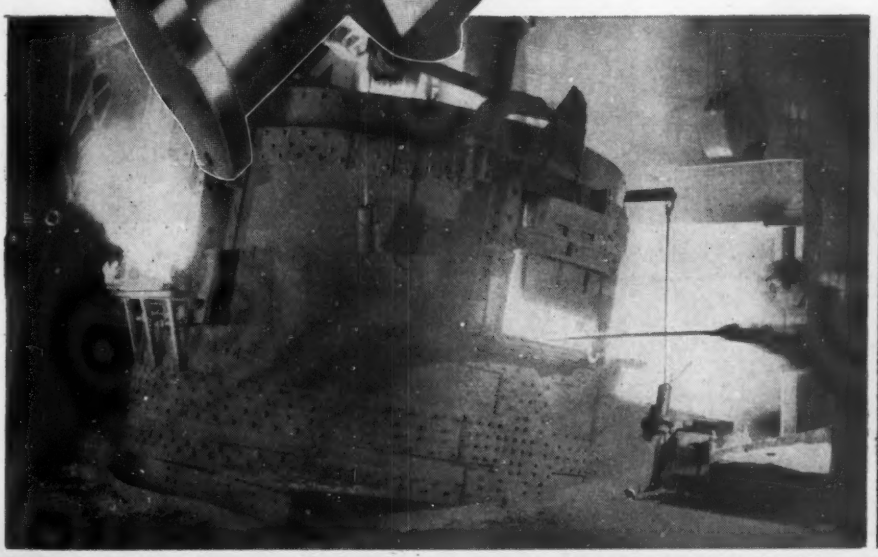
WHAT ABOUT THE *STEEL* IN THE *FORGINGS* YOU BUY?

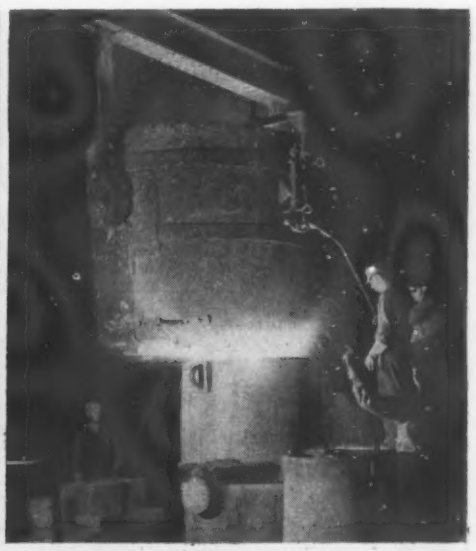
Every heavy duty forging has a tough job to do—that is why a forging is used. To do the job well it must possess definite prerequisites. First and foremost it must be made of high quality steel. The steel should be of clean homogeneous structure free from injurious defects and inclusions. The chemical analysis should be held within the specification limits and the grain size should be suited to the job. Do you make sure that you get this kind of clean steel in the forgings you buy?

This Diesel locomotive crankshaft requires steel of the highest quality to perform its exacting duty in railroad service.

NATIONAL FORGE MAKES ITS OWN STEEL

as the only way it can assume complete responsibility for the quality of the forgings it makes. At National, Heroult Basic Electric melting furnaces are used, thus producing steel with low sulphur and phosphorous contents. The grain size, abnormality and hardenability are more uniform and with close laboratory control over the steel making, high quality steel is obtained. With modern equipment available for extensive testing, including Magnaflux, the quality of the steel is assured. If you want to know that you are getting quality steel in your forgings, why not consult with National Forge?





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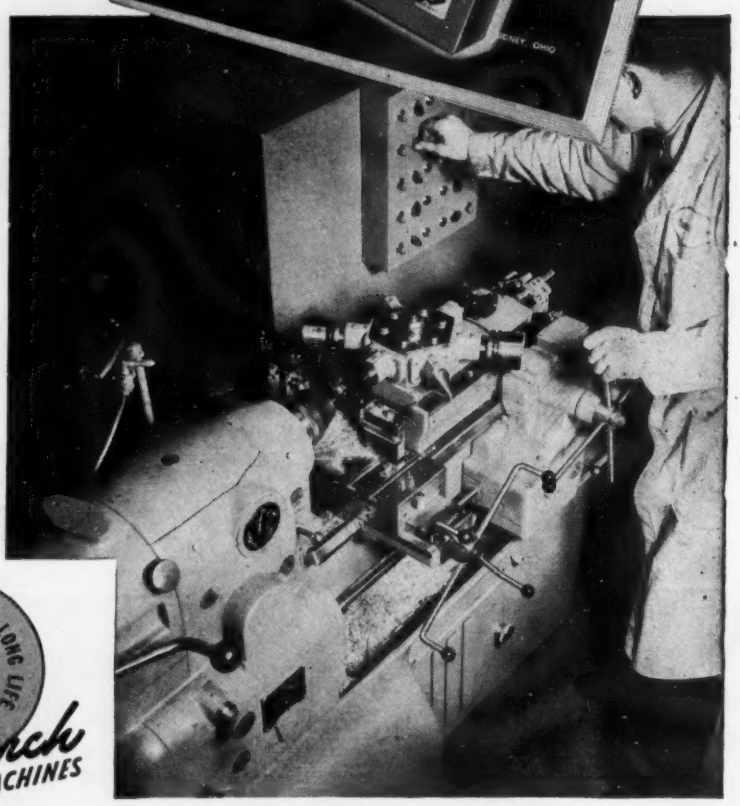
Typical examples of actual jobs, as well as principle features and specifications of the Speedi-Matic, are described and illustrated in our new 20-page catalog, form 1901B. To make certain you receive your copy promptly, use the handy coupon below—or write to The Monarch Machine Tool Co., Sidney, Ohio.



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STEEL

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VOL. 119, NO. 23 DECEMBER 2, 1946

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As the EDITOR VIEWS the NEWS

A Job for Strong Men

One approach to a clear understanding of the impasse in coal is to review the records of the principals—John L. Lewis and the government.

Lewis, long identified with A. F. of L., broke with that organization when he formed CIO, a group of industry-wide unions contradictory in principle to the traditional A. F. of L. concept of craft unions. CIO unions were expelled from A. F. of L. Lewis supported Roosevelt in 1936 and CIO donated $500,000 to the New Deal campaign fund. In 1940 Lewis supported Wendell Willkie and when he lost, Lewis kept a campaign promise by resigning as CIO president but retained his presidency of UMWA. In 1942 he led UMWA out of CIO. He called two major mine strikes in 1945, one early this year and now the current one.

The government, partly in recognition of the donation by the Lewis-dominated CIO, gave him the closed shop, check-off, portal-to-portal pay, a royalty on coal for miners' relief and other grants so liberal that the owners of the mines cannot operate them profitably under the contract Lewis "negotiated" with the government and which he now has repudiated.

With these two records in mind, what is the solution? On one hand is Lewis who has hoodwinked the government into giving a monopoly so strong that he can defy the nation. On the other hand is a government which in appeasing Lewis at every turn has created a situation that can easily wreck the coal industry and seriously impair the economy of the entire country.

The logical solution is one that goes as far as possible toward wiping out the grave mistakes of both principals. Perhaps the complete remedy cannot be accomplished in one step. Ultimately, however, the contract with the mine workers must be one that can be adapted to private operation of the mines. A new contract between Lewis and the government would be artificial and meaningless.

On the basis of this reasoning, industry has a direct responsibility to do what it can to help clear up the present mess. To sit idly on the sidelines and to say "let Washington stew in its own juice" is a shortsighted, futile attitude. The problem, unjustly, is on industry's doorstep because of government impotency.

There are industrialists with heavy stakes in coal who are fully competent to deal with Lewis. Their service at this critical time would be far more effective than anything that official Washington can do. Here is a challenge to industrial statesmanship.

STEEL
December 2, 1946

ECONOMIC HARA-KIRI: One of the most discouraging aspects of the coal strike from industry's standpoint is that its effect is beginning to be felt at a time when producers and manufacturers were beginning to see daylight ahead after having been swamped for months by orders that far exceeded shipments.

A case in point is nails. More than 50,000 tons of wire nail and staple production was lost early in 1946 because of strikes. Manufacturers worked hard to make up for this loss. During September nail shipments were equivalent to the highest peacetime annual rate since 1923. If this high rate of shipments could be continued for a few months, the acute shortage of this product that is so important to the housing program would be relieved to a marked extent.

Similarly, output of many other items such as automobiles, fabricated structural steel, machine tools, electric power, etc. was mounting at a gratifying rate at the time the miners went out. Now this latest interruption is causing a slowdown in al-

(OVER)

most every line of industry. The momentum of continued activity, which means so much in terms of profits, wages and economical production, will be lost.

Some day, when workers can see and figure out for themselves what they win and what they lose by participating in industry-wide strikes, they will think twice before blindly following a John L. Lewis.

—pp. 81, 82, 164

• • •

DON'T MISS DEADLINE: Dec. 21 is the deadline set by the State Department for the submission of written suggestions by exporters, importers, manufacturers and other private business interests to be considered in connection with reciprocal trade agreements scheduled to be negotiated with 18 countries early next year. The same date is the deadline for filing applications to be heard orally. The views of interested business men will be aired at hearings to be held simultaneously throughout the nation on Jan. 13.

These hearings are preliminary to negotiations which will take place in April. The United States will attempt to reach trading agreements on numerous products with Australia, Belgium, Brazil, Canada, Chile, China, Cuba, Czechoslovakia, France, India, Lebanon, Luxemburg, Netherlands, New Zealand, Norway, Union of South Africa, Union of Soviet Socialistic Republics and the United Kingdom.

Our treaties with these nations will cover a substantial portion of our postwar foreign trade. Interested industrial companies will do well to file their suggestions or applications for oral discussion promptly. The time before Dec. 21 is short. —p. 84

• • •

OXYGEN IN OPEN HEARTH: As long as oxygen was available in limited volume and at high cost, the interest of steelmakers in the possibilities of oxygen-enriched air combustion in open-hearth furnaces was confined to cautious experimentation along academic lines. Now research work has been completed which assures tonnage production of oxygen with a purity of 45 to 98 per cent at lower cost.

This development is stimulating efforts to increase the production of open-hearth furnaces by firing oxygen with the regular fuel during the meltdown period. While much remains to be learned about this process, and certain limitations already are evident, experimental work to date indicates that the use of oxygen will increase the outputs of many open-hearth plants by from 20 to 40 per cent with little change in furnace design.

This is an alluring objective for steelmakers hard pressed to meet ingot requirements. Small wonder producers are currently "oxygen conscious"! —p. 106

SIGNS OF THE TIMES: After a prolonged delay the shipyard at Mobile, Ala., operated during the war by Alabama Shipbuilding & Dry Dock Co., has been leased by WAA to a new shipbreaking company. Signing of this lease establishes a pattern for the leasing of other yards (p. 89) and improves the prospect of obtaining substantial tonnages of scrap from obsolete vessels. Some authorities believe shipbreaking may be yielding scrap at the rate of a million tons annually by the end of next year. . . . Latest compilation of the steel required in the 1946 Ford passenger car shows a total of 2401 pounds (p. 92), including 1037 pounds of cold-rolled material, 680 pounds of hot-rolled, 25 of terne plate, 48 of special section and 611 pounds of some 45 different types of steel. . . . Dun & Bradstreet reports that the decline in new business incorporations continued in September (p. 164), when only 9509 new companies were launched. This is the smallest monthly total recorded in the first three quarters of 1946. . . . Norton Co. has developed a 99.6 per cent usable aluminous abrasive (p. 104), the final grain or crystal of which is produced for the first time in the electric furnace without requiring crushing or milling. Tests show that wheels of this abrasive have greatly improved cutting characteristics. . . . A broad new program of standardization recently announced by members of the motor and generator section of the National Electrical Manufacturers Association establishes set dimensions for fractional-horsepower motors (p. 120) which will permit machinery and appliance manufacturers to obtain the proper models of these units from all suppliers without going through exhaustive engineering tests for each application. . . . After surveying plans for Chevrolet, Lincoln-Mercury, Nash and Kaiser-Frazer automobile assembly plants in Los Angeles county (p. 97), West Coast enthusiasts are confident that the output of car assemblies will rise from a prewar total of 154,000 annually to about 650,000 per year. . . . The studies on guaranteed wage systems, originally scheduled for release in November (p. 86), have been delayed. The government study will be submitted "sometime next year" and the Brookings Institution report will be out in book form in January. . . . Dr. P. G. Agnew, vice president of the American Standards Association, predicts that progress in the development of international standards (p. 78) will be speeded as a result of the new International Organization for Standardization, which will be formally launched soon with headquarters at Geneva, Switzerland.

E. C. Shaner

EDITOR-IN-CHIEF

How to Lower The Machine-Side Cost of Steel

Steel is a low cost large tonnage product when compared with other metals. But the net cost delivered alongside your machinery and equipment varies greatly in different plants depending upon the mill methods of packing and shipping—and the manufacturers' methods of receiving and handling.

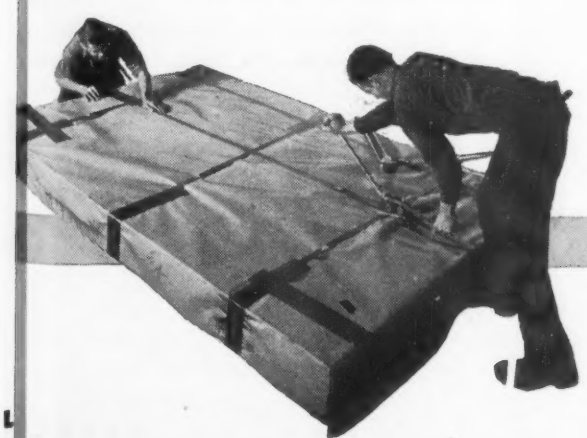
The preservation of quality is still another factor in final machine-side delivery. For these reasons Inland packing and shipping experts are always studying and trying new and better methods that will not only protect the quality but lower the delivered cost of steel.

They are also glad to work on your particular problems—determining the method of transportation; type of cars or trucks required; sizes of lifts or packages; protection needed for material in transit; methods of unloading; character and capacity of unloading and handling equipment... all important factors in net costs of delivered steel.

Proof of results is revealed in cases where unloading costs were reduced by 75% . . . car unloading improved from 6 to 16 cars in eight hours . . . storage space reduced 40% . . . and there are many other cases of important savings for Inland customers.

We are still unable to meet the great demand for Inland steel . . . but we are always glad to cooperate with our customers in determining not only the right steel for their particular needs but also to aid them in developing the lowest possible machine-side cost of steel.

You are invited to call whenever you believe we may be of service.



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INLAND STEEL

Steel Shortage Emphasizes Need for —

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2. More care in storing steel
3. More ingenuity in adaptation

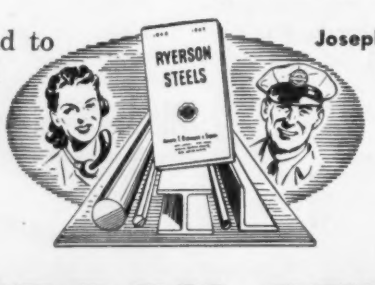
Today's shortage points up as never before the importance of using every available pound of steel to best advantage. It's the responsibility of buyer and seller alike.

Because a machinery breakdown may necessitate replacements not readily available under present conditions, extra maintenance care is essential. Regular painting of exposed surfaces and thorough lubrication of working parts will often prolong the useful life of plant property and equipment considerably.

Industry can cooperate by more careful storage and handling of its steel inventories. Many manufacturers have some steel on hand, but inadequate protection and poor handling facilities may cause deterioration and sometimes the stocks are not in satisfactory condition when needed.

Ingenuity in adapting steel on hand to needs of the moment is a third essential today. Steel buyers can help by specifying cut size on orders for stock lengths, allowing steel-service plants to draw on their inventory of shorts. And the steel warehouse itself can make wide use of adaptation. For example, Ryerson plants continue to carry fair stocks but orders for popular sizes of many products are so numerous that the demand cannot always be met. When this happens, we can often suggest alternate kinds or sizes to do the job. An alloy bar replaces a carbon bar. Two angles form a square tube. In one way or another we may be able to help keep production moving despite the steel shortage.

Our organization is constantly on the watch for ways to make the available steel supply useful to more customers. We promise no miracles, but we will certainly do everything in our power to serve you when you call.



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RYERSON STEEL

The silhouette of John L. Lewis is symbolic of the darkness cast over the nation by the coal strike as "brown-outs" went into effect and industrial operations were cut to conserve rapidly diminishing stocks of fuel

Industry Slows Down at Rapid Pace

Primary steelmaking operations hit severely as producers curtail with coal supplies limited. Thousands of workers furloughed and unemployment rolls are expected to mount alarmingly as effects of miners' strike hits manufacturing industries

WITH bituminous coal mining at a virtual standstill last week as 400,000 members of the United Mine Workers stayed away from their jobs in the pits pending settlement of the contractual dispute between their leader, John L. Lewis, and the government, the wheels of industry began to grind rapidly to a stop.

Blast furnace and steel mill operations already have been adversely affected to an alarming degree. Within a week of the miners' walkout, midnight Nov. 20, steel ingot operations had dropped from over 91 per cent of capacity to around 65.5 per cent, and expectations are a further drop of 20 or more points can be expected this week unless mining is resumed quickly. At last midweek it was estimated 45 blast furnaces had been banked and thousands of steelworkers furloughed.

Indications are that the effect of the current strike will be much more quickly reflected in general industry than was the case in the walkout of last spring. During the first month of the spring strike, April, there was an immediate and severe setback in steel production, but it was not until May that the disasterous effects of the stoppage became apparent. Pig iron output dropped by 49 per cent from March, and beehive coke production receded 96 per cent below the March level. Cement production in May declined 16 per cent from March, while the index of industrial production was pulled down to 159 from 168 in March.

Since steel industry stocks of coal are below normal, varying from 8 to 30 days between the separate plants, continuance of the coal strike for more than a couple weeks will force virtual suspension of steelmaking operations in a little more than a month, it was said. So far, shutdowns largely have been confined to primary capacity, such as blast furnaces, open hearths, bessemers and coke ovens. However, some rolling mill facilities have been forced down and indications point to widespread suspension of rolling activities within another week with stocks of raw steel insufficient

to support production schedules. Raw steel will be diverted as far as possible to sustain operations of the sheet and strip mills.

Closely following upon the shutting off of finished steel production general manufacturing operations will be affected since metalworking shops' steel stocks have been low for months and it will be impossible to maintain manufacturing operations on a large scale with steel shipments reduced to a dribble. In such event, the accompanying disemployment would be unparalleled, being estimated in some quarters up to 25 million workers.

It is estimated more than 500,000 tons of steel production were lost in the first week of the current coal strike. The pre-strike ingot rate was at a postwar high of 91.5 per cent of capacity, equivalent to 1,610,800 net tons weekly. Last midweek the drop in operations had pulled weekly production down to 1,110,800 tons.

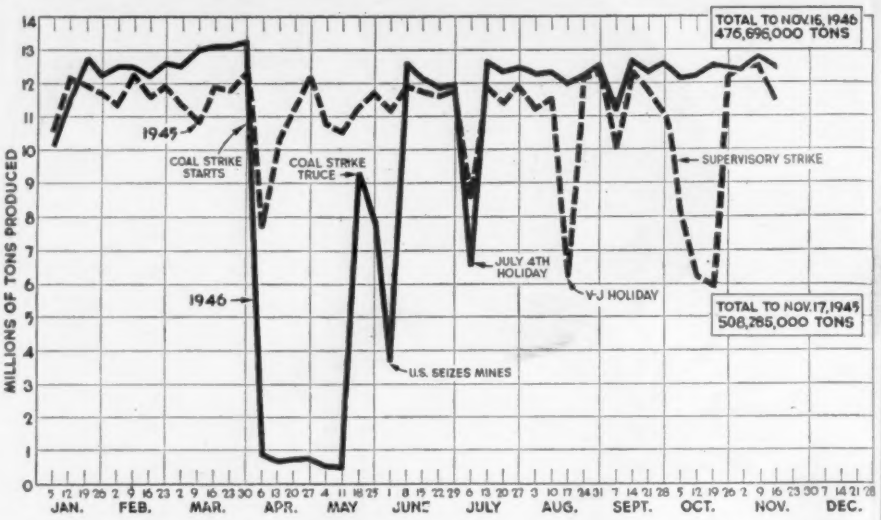
One report circulating last week was to the effect the Civilian Production Administration was considering halting steel allocations on the ground there will be insufficient steel to ration once essential needs are met. Housing Expediter Wilson Wyatt was said to be opposed to such action, however, contending the government should continue to channel steel into new houses for veterans, however great the shortage.

Freight Embargo Rumored

Fears were widespread throughout the country last week that a nationwide freight embargo might be put into effect as a coal conservation measure. So far as could be learned, however, the government planned no such drastic action. It was pointed out that should such a step be taken it would quickly bring to a virtual halt the entire economy of the nation.

The current coal stoppage is the third experienced in 14 months, and it threatens to nullify completely the steel industry's attempt to recoup production losses sustained by the miners' strikes in the fall of 1945 and the spring of this year, as well as the month-long strike of steelworkers in January-February. During August, September and October, with labor conditions placid, steel production exceeded 6,700,000 tons monthly, in sharp contrast to the disappointing showing of the first half of the year when approximately 12 million tons of finished steel were lost because of the work stoppages.

Whether the strike will be of short or long duration was anybody's guess last week. The government took steps to conserve stocks of coal above ground as far as possible, Solid Fuels Administrator J. A. Krug warning all industrial and domestic consumers that only by the strictest saving can widespread suffering and collapse of essential services be averted. Various freeze orders were issued, and brownouts and other stock-saving measures effected.



Record of bituminous coal production over past two years is marred by periodic major strikes and work stoppages

No estimate was available up to late last week as to the amount of coal taken over by government freeze orders, but it is thought less than 2-days' production will be available for distribution to the limited classes of consumers which were placed in the critical categories. Preliminary estimates of coal stocks in consumers' hands show the nation in a less favorable position than it was last spring at the beginning of the 29-day strike of the miners. At that time visible stocks of soft coal amounted to 58,531,000 tons, equivalent of 42 days' supply. Today stocks are estimated at 57 million tons, or 37 days' supply, with consumption at a much higher rate than last spring.

Administrator Krug last week said that more than half of the byproduct coke plants will be compelled to curtail production promptly, and many of them will be forced to suspend operations entirely within two weeks. About 17 per cent of the bituminous coal mined is used in the manufacture of coke, most of which goes to the steel industry. On Nov. 1 byproduct coke ovens had an average of only 27 days' supply of coal, and coke supplies at blast furnaces and foundries were at low operating levels. The coal stock position of the coking industry actually was more serious than the stock figures indicated since many plants had been working on day-to-day shipments.

Electric utilities are estimated to have an average of two and a half months' coal supply, but it was said one out of six plants will be out of commission within two weeks unless operations can be prolonged by drafts from emergency supplies. One out of every five railroads, it is said, will be compelled to curtail operations beyond the limits already set by the government unless coal stocks can be replenished quickly.

Bituminous coal production has averaged 12,133,000 tons weekly since the government took over the mines May 28 last. The 59-day strike in the mines in April cost the nation an estimated loss of 81,549,272 tons of coal.

Production of soft coal in the week ended Nov. 16, the last week prior to the current strike, was estimated by the Bureau of Mines at 12,500,000 tons, compared with 12,700,000 tons the preceding week, and with 11,518,000 tons in the week ended Nov. 17, 1945. Cumulative production of soft coal during the calendar year through Nov. 16 approximated 476,696,000 tons, which was 6.2 per cent below the output in the comparable period of 1945.

While the government and John L. Lewis last week fought out in federal district court in Washington the legal questions raised by Lewis' termination of the miners' contract, rumors floated about the Capital that behind-the-scenes moves were underway looking toward settlement of the strike through face-saving measures for both Lewis and the government. Several representatives of the mine owners were said to have conferred with Lewis. There was no confirmation of these rumors up to the time Lewis' trial began last Wednesday. However, it was reported suggestions had been made that the government drop its legal action against Lewis and turn the mines back to private ownership. In turn, Lewis would call off the

strike and begin negotiations with the mine owners for a new contract.

Whether such a move was possible was questioned in informed circles. For one thing, it was pointed out that the government now finds itself in such position it must carry through its legal action against Lewis if the supremacy of government and law is to be upheld. Every indication last week was that the case against Lewis would be pressed to completion. In event the government loses in Circuit Court it likely will take the case immediately to the Supreme Court for quick decision. Hearing by the Supreme Court, it was said, could be had within two weeks.

At the same time question was raised whether the mine operators would consent to take back their properties under the contract terms which the government agreed to last spring. To attempt to operate the mines under private ownership with the government contract terms still in effect would be economically suicidal. Mine costs, it is said, have soared to unprecedented heights under government operation.

Pending conclusion of the case against Lewis there was no guessing what decision Federal Judge Goldsborough would render. Opinion, however, seemed to be that no point would be gained by incarcerating Lewis in event he is found guilty of contempt of court. Possibility that a heavy fine might be imposed on the union was a subject for some speculation. As a matter of fact, it was said that levying of a fine against the union itself would be much more effective in getting the miners back to work than would the jailing of the union leader, since the latter action might provide the opportunity for labor unions to hold Lewis up as a "martyr" in the cause.

In this connection, action by the Virginia State Corporation Commission last week in ordering Lewis and representatives of the United Mine Workers' union to appear at a hearing Dec. 2 to answer charges the union violated the state securities law by selling union memberships in the state was considered significant. The commission ordered Lewis and the union to show cause why a temporary injunction should not be entered ordering the union to halt sales of such memberships. The hearing, it is said, will hinge primarily upon whether union memberships can be construed as "securities." Under Virginia law sale of unqualified securities is forbidden.

Situation in the various steelmaking areas as reported by STEEL's district editors follows:

Shutdown Threatens in South

BIRMINGHAM — Shutdown of the iron and steel industry in the district was underway last week. The district is facing complete paralysis of its industrial machine, due not only to the strike of coal miners but also to a threatened walkout Dec. 1 of by-product coke oven workers in Alabama By-Products Corp., and Sloss-Sheffield Steel & Iron Co., Birmingham, and Woodward Iron Co., Woodward, Ala., suppliers of industrial and domestic gas. These workers are demanding a wage increase of 20 cents an hour.

Miscellaneous industries of the district will feel the pinch in steel supplies immediately and a general slowing down of industrial activity is expected by the end of this week.

Steelmaking operations in this district dropped to about 47 per cent of capacity last week, a decline of 52 points. In addition to curtailment of open hearth and blast furnace operations, rail mills and other miscellaneous operations were being reduced. Some 3600 steelworkers have been affected, it is estimated.

Cleveland Operations Hold

CLEVELAND — Steelmaking operations in this district held up well last week compared with the sharp reductions recorded elsewhere. The ingot rate dropped only 1 point to 92 per cent of capacity, the highest for any section in the country. National Tube Co. and Republic Steel Corp. increased open-hearth furnace output slightly while Jones & Laughlin Steel Corp. banked one furnace.

Of the nine blast furnaces in the Cleveland area only three were down. Finishing mills maintained operations at a high rate with only a few strip and bar mills closed down completely.

Producers are maintaining production schedules on a day-to-day basis and will not reduce operations until they are forced to by material shortages, a rail embargo or similar development.

Cutback Severe at Youngstown

YOUNGSTOWN — Ingot operations averaged 40 per cent of capacity in this district last week as the result of curtailments in operations forced by the coal strike. Only 35 open hearths and nine blast furnaces were in production at the end of the week.

Carnegie-Illinois Steel Corp.'s Ohio Works cut back, suspending activity at three blast furnaces, the bessemer plant and four open hearths. Shenango Furnace Co. banked one blast furnace, and Sharon Steel Corp. is banking another.

Additional cutbacks are scheduled, and it was estimated that at the end of last week 15,000 to 20,000 workers had been

(*Please turn to Page* 185)

Present, Past and Pending

■ TIN PLATE SCRAP CONTROLS ARE REMOVED

WASHINGTON—All controls on tin plate scrap deliveries, including used tin cans, have been revoked by the CPA. Order M-325 was revoked, the agency said, because tin recoveries from scrap are negligible since shutdown of the government's detinning plant, and declining salvage results.

■ INDUSTRIAL WORKERS' TAKE-HOME PAY RISES

WASHINGTON—Industrial workers' take-home pay in October averaged about 12 per cent higher than in October, 1945, but living costs increased 15.1 per cent from Oct. 15, 1945 to October, this year, according to the Bureau of Labor Statistics. Average earnings in all manufacturing for October were $45.88 with a 40½-hour work-week and hourly earnings of $1.13.

■ MANUFACTURERS' SHIPMENTS RECORD-BREAKING

WASHINGTON—Dollar value of manufacturers' shipments in October totalled more than $12,500,000,000, highest peacetime figure on record, according to the Commerce Department. Part of the figure reflects higher prices.

■ SEVERAL AUTO BUILDERS RAISE PRICES

DETROIT—Chrysler Corp. last week raised factory list prices on all models produced by its divisions, ranging from $8 on the lowest priced Plymouth up to $105 on the highest priced Chrysler. Previously Hudson Motors had announced a price increase of around $65, and Studebaker made increases ranging from $32 to $64.

■ GENERAL MOTORS PRODUCTION RISES

DETROIT—General Motors Corp. production of cars and trucks moved up another 1600 units for the week ending Nov. 23, to a new postwar high of 43,127, of which 31,993 were passenger cars.

■ KOCH NOMINATED TO HEAD ILLINOIS ASSOCIATION

CHICAGO—Raymond J. Koch, president, Felt & Tarrant Mfg. Co., this city, has been nominated for president, Illinois Manufacturers' Association. Election will take place at the association's fifty-third annual dinner meeting Dec. 10 at the Stevens Hotel.

Standardization Progress Reported

Speakers at annual meeting of ASA emphasize important strides made toward objectives. Notable advances being made in adopting wartime standards to peacetime use

Frederick R. Lack succeeds Henry B. Bryans as president of ASA at largest convention in history of the organization. George H. Taber Jr. elected as vice president of association

IMPORTANT strides in standardization were reported at the twenty-eighth annual meeting of the American Standards Association at the Waldorf-Astoria, New York, Nov. 21-22, with attendance the heaviest in the history of the organization, exceeding 500 at some sessions.

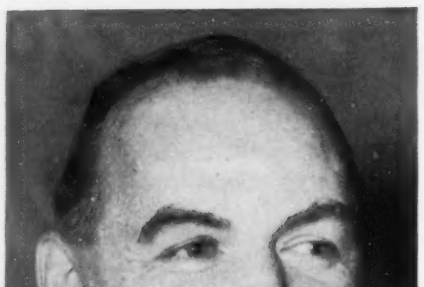
Frederick R. Lack, vice president, Western Electric Co., New York, was elected president of the association for the ensuing year, succeeding Henry B. Bryans, executive vice president, Philadelphia Electric Co., Philadelphia. Mr. Lack was formerly vice president of the ASA. George H. Taber Jr., executive vice president, Sinclair Refining Co., New York, was named vice president of the association.

L. F. Adams, acting chairman of the Standards Council of the Association, and manager of the Standards Division, Executive Department, General Electric Co., Schenectady, N. Y., pointed out that during the emergency ASA machinery provided the country with 153 standards adopted under its war standards procedure, and that there has been notable progress in reviewing these emergency standards for peacetime use and in the development of new regular standards.

To date reviewing procedure has resulted in reaffirmation of 15 standards, leaving 138 still to be disposed of. Ninety-eight of the remaining wartime standards, he declared, already are under review by committees but have not as yet reached the approval stage.

Thirty-one new standards not connected with war have been approved in the past year and 13 revised regular standards have been approved, making a total of 44. "In the year up to our previous annual meeting, 22 new standards were approved and 21 revised regular standards were adopted," he declared. "Thus while the total of all standards in the past year numbers 53 against 87 in the previous year, the difference is more than accounted for by the fact that only nine more standards fall into the current accounting compared with the preceding year."

Mr. Adams called particular attention to two projects completed during the past 12 months in the peacetime field; namely, the code developed under the leadership of the National Fire Protection Association by its Electrical Code Committee and the new American standards for modular sizes of masonry units.



FREDERICK R. LACK
Elected President of ASA

Standardization in the field of accident prevention has now resulted in approval of 152 standards. Tremendous expansion in the use of the x-ray during the war, he also pointed out, has made it necessary to advise both employer and employee as to the hazards involved if impairment of health and bodily injury on a large scale are to be avoided. One of the important avenues chosen was the development of a standard covering the construction, installation and use of the x-ray.

The speaker mentioned important new work in the mechanical field. As one example out of many, so he said, he called attention to the new standard B5.19, life tests of single-point tools made of materials other than sintered carbides. This standard, he said, becomes the eighteenth American standard developed by the ASA committee on small tools and machine tool elements, and establishes for the first time a new uniform basis of rating the useful life to be expected of this type of cutting tool. These cutting elements, he pointed out, are vital parts to such machine tools as lathes, boring mills, planers and shapers.

Howard Coonley, chairman, executive committee, ASA, reported that "some 20 new areas had been brought into the ASA sphere of interest in the last 10 months." In the industrial groups, he mentioned aircraft manufacturers, aluminum producers, the boiler companies, chemicals, foundries, instrument makers, new sections of the nonferrous metal industry, office equipment, air conditioning, and others.

The Company Member Committee has investigated the question of an all-purpose bolt and nut, and recommended to Standards Council that this be referred to the sponsor of the screw thread project, the American Society of Mechanical Engineers.

"This country has fought its last extravagant war; we simply do not have the raw material to do it again," General Donald Armstrong, assistant to the chairman, executive committee, ASA, declared. History of World War I and World War II proved there will not be time enough in the event of another attack to do the kind of emergency standardizing and specification work which "went on frantically in the previous struggles." This important effort for national security must be undertaken now, he said. He revealed that representatives of both the Army and Navy had been invited to become full members of the ASA Company Member Committee.

Prior to the meeting Dr. P. G. Agnew, vice president, ASA, in a press conference, predicted that progress in the development of international standards will progress rapidly as a result of the new International Organization for Standardization.

He had just returned from a meeting in London where he was the chief American delegate, and reported that ISO will be formally launched when the ratification of the constitution and rules is voted by 15 countries. He expected this within six months. ISO headquarters will be set

up shortly in Geneva, Switzerland, to be directed by a technical executive likely to be appointed in the near future.

Mr. Coonley was elected president of ISO, while Gustave L. Gerard, staff president, Belgian Standards Association, was elected vice president.

Some 40 standardization projects are being reviewed by the new organization, whose work will be carried out through technical committees upon which any of the countries may be represented.

Dr. Agnew explained that ISO consolidates into a single organization the work of the prewar International Federation of National Standardizing Associations and that of the war-born United Nations Standard Co-ordinating Committee. The International Electro Technical Commission will affiliate with ISO as its electrical division. The UN Committee will continue to function until the new body is completely organized.

The Russian delegation to the London meeting pressed vigorously and successfully for recognition of the Russian language as an official language, thus making for three official languages to be used in the work: English, French and Russian. It is understood that Russia has volunteered to pay all expenses for the necessary translation into Russian.

Henry B. Bryans, retiring president of ASA, announced the association was moving to speed up in the consumer standardization field. To that end, he said, the association has filled three posts on its board of directors "with representatives thoroughly familiar with consumer problems."

Ephraim Freedman, director, Bureau of Standards, R. H. Macy & Co. Inc., New York, who substituted as a luncheon speaker for Charles E. Wilson, president, General Electric Co., Schenectady, prevented by illness from attending, declared that "Standards for your products created by voluntary efforts on your part will go a long way toward preserving free enterprise."

The annual dinner, concluding the convention, was featured by the introduction of the new president and by two addresses, one by Lt. Gen. Ira C. Eaker, deputy commander, Army Air Forces, on "Two Wars—the Last and the Next" and the other by Dr. K. V. Wellington Koo, Ambassador of China, on "The Industrial Future of China."

Tower Stresses Important Role of the Metallurgist

Metallurgists are custodians of materials on which the welfare of countless generations must depend, Walter S. Tower, president, American Iron & Steel Institute, told members of the American Society for Metals meeting at Atlantic City, N. J.

GEORGE H. TABER JR
Chosen vice president of ASA

He stated, "The metallurgist has dug deep into his bag of tricks and come up up with industrial applications of elements which were, until a few years ago, largely laboratory items. The wider and more attractive horizons to lure the venturesome metallurgist now seem to lie in the direction of preparing metals for use, since the basic knowledge of separating metals from ores has been pretty well solved and great strides have likewise been made in the metals and economies of refining metals."

Commenting on some belief that the use of ferrous metals (steel, iron and their alloys) may be displaced in the not distant future because of desirable qualities of the light metals, aluminum and magnesium, Mr. Tower declared, "It does not seem likely that future progress of metallurgical skills will bring any considerable displacement of ferrous metals by the nonferrous. It is likely, and perhaps desirable, that in some uses other metals may take the place which some kind of steel has heretofore occupied. However, as we know metals, it seems clear that the broad foundation industrial use of metallic products must continue indefinitely to rest on the ferrous family. That conclusion is supported by the facts in regard to potential supply, prospective cost of production, price to the user and versatility in use."

Sees Good Year Ahead If Boat Is Not Rocked

CPA Administrator Small Tells Conference Board prospects are promising if major strikes and inflation are avoided

"IF THE industrial boat is not rocked by runaway prices or major work stoppages," 1947 should be a good business year, John D. Small, Civilian Production Administrator, declared in New York recently.

Speaking at the National Industrial Conference Board's 282nd meeting at the Waldorf-Astoria, he asserted that what prices do from now on will be a major factor in deciding whether or not the country is going to have "a boom and bust period. It will take real business statesmanship," he observed, "to get through the months ahead without having prices rise to the extent where they will choke off production."

Mr. Small was one of three speakers on a symposium on "The Outlook for Business." The other two were Marvin E. Coyle, executive vice president, General Motors Corp., Detroit, and Harvey S. Firestone Jr., president, Firestone Tire & Rubber Co., Akron, O.

Other major factors offsetting the favorable position of demand and purchasing power in the domestic and foreign markets, Mr. Small declared, are materials shortages in some important directions, rising inventories and industrial unbalance. Inventories are not too high when compared with sales volume, but they are going up rapidly. In three months—June, July and August—overall inventories rose nearly $3 billion, and they are still advancing.

Commenting on industrial unbalance, he cited the particular case of fractional horsepower motors. Makers of this equipment, he said, have order backlogs for almost 42 million motors, about 24 months production at the current rate.

He commented also on some preliminary studies done by his staff on steel capacity. His staff extended the trend of steel production from 1901 to date and also the trend in steel production per capita for the same period. The staff related steel production to the Federal Reserve index of production and to the gross national product, the sum of all goods and services.

"I am not sure how accurate the results are," he declared, "but they indi-

cate that by 1950 we will need steel ingot production of from 90 to 100 million tons per year. Currently we are producing steel at the rate of about 80 million tons a year and are operating the mills at practically capacity—a little over 90 per cent of theoretical capacity.

"These figures make me wonder whether we will have the steel capacity we will probably need to support a full-employment and full production economy in 1950—only a little more than three years away."

Mr. Coyle forecast that the outlook of the automobile industry for this year would total 2,200,000 passenger cars and 1 million trucks, 3,200,000 units in all. Current monthly production of 400,000 units, he said, was equal to the average monthly rate of 1931 and second only to the average in 1939, when a total of 5,300,000 units was produced.

He saw little hope of exceeding current production in the first six months of 1947, and predicted that output for 1947 as a whole would run between 4 million and 5 million units. In 1948, however, he considered the industry might reasonably attain an output of between 5 million and 6 million units.

Pointing out that the performance of the automobile industry since the end of the year had been "most disappointing," he observed that this was not because of low pricing by the Office of Price Administration or increases in exports, the latter being the same percentage-wise as before the war. The real reasons, he said, were the difficulties in reconverting plants that had been torn apart for war production, the long strikes and the shortages in steel, pig iron, lead, copper and zinc.

Mr. Firestone said there was danger of a recession which existed "not because supply will catch up with demand, but because increased manufacturing costs and lower manpower production may force retail prices temporarily to such high levels that people cannot afford to buy the output of our economy, even though they have greatly increased spendable incomes.

Calendar of Meetings . . .

Dec. 2-4, Society of Automotive Engineers: National air transport engineering meeting, Edgewater Beach Hotel, Chicago. John A. C. Warner, 29 West 39th St., New York 18, secretary and general manager.

Dec. 2-6, American Society of Mechanical Engineers: Annual meeting, New York. C. E. Davies, 29 West 39th St., New York 18, secretary.

Dec. 2-7, 17th National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York. Show headquarters are at Grand Central Palace.

Dec. 5-7, American Institute of Mining & Metallurgical Engineers: Electric Furnace Steel Committee, annual meeting, Hotel William Penn, Pittsburgh. Headquarters are at 29 West 39th St., New York 18.

Dec. 5-7, Electron Microscope Society of America and American Society for X-Ray and Electron Diffraction: Joint winter meeting, to be held at the Mellon Institute of Industrial Research and the University of Pittsburgh, Pittsburgh. Local chairmen of the societies are Dr. S. S. Sidhu, University of Pittsburgh, and Dr. Earl A. Gulbransen, Westinghouse Research Laboratories, East Pittsburgh, Pa.

Dec. 6-7, Society for the Advancement of Management: Annual conference, Hotel New Yorker, New York. Society headquarters are at 84 William St., New York 7.

Dec. 9, American Society for Metals: Cleveland chapter meeting, YMCA Auditorium, Cleveland.

Dec. 9-11, Society for Experimental Stress Analysis: Annual meeting, Hotel New Yorker, New York. W. M. Murray, Central Square Station, Cambridge 39, Mass., is secretary-treasurer.

Jan. 6-8, Institute of Scrap Iron & Steel Inc.: Annual convention, Commodore Hotel, New York. Edwin C. Barringer, 1626 K St. N. W., Washington, is president and executive secretary.

Jan. 13-14, Truck-Trailer Manufacturers Association: Annual convention, Hotel Peabody, Memphis, Tenn. John B. Hulse, 809 National Press Bldg., Washington 4, is secretary-manager.

Jan. 14, New England Iron & Hardware Association: Annual banquet, Copley Plaza Hotel, Boston. Charles W. Henderson Jr., 88 Broad St., Boston, secretary-treasurer.

Jan. 14-17, National Materials Handling Exposition, Public Auditorium, Cleveland. Edwin J. Heimer, president, Barrett-Cravens Co., Chicago, is chairman of the exposition committee.

Jan. 27-31, Electrical Engineering Exposition, 71st Regiment Armory, Park Ave. and 34th St., New York. Exposition to be held concurrently with the convention of the American Institute of Electrical Engineers. Headquarters of the show are at Grand Central Palace, New York 17.

Pig Iron Output Increases in October

TOTAL production of pig iron, including ferromanganese and spiegeleisen, increased to 4,814,561 net tons in October from 4,687,390 in September, according to the American Iron & Steel Institute. However, blast furnaces operated at only 84.1 per cent of capacity during October compared with 84.8 per cent in September.

Total production for the first ten months was 36,909,344 tons, or 65.8 per cent of capacity.

October production included 4,752,989 tons of pig iron, compared with 4,625,914 in the previous month, bringing the total for the first ten months to 36,484,085 tons. Distribution by districts in October was as follows: Pittsburgh-Youngstown, 1,913,870; Chicago, 1,007,136; eastern, 888,748; Cleveland-Detroit, 513,036; southern, 320,390; and western 109,809. The latter district operated at only 45.6 per cent of capacity during October while at the other extreme Cleveland-Detroit district operated at 92.1 per cent.

Ferromanganese and spiegel output totaled 61,572 tons in October compared with 61,476 tons in September.

Production of steel increased to 6,909,597 net tons in October, representing 88.5 per cent of capacity, from 6,517,894 tons in September. This brought the total for the first ten months to 54,253,176 tons, representing 70.9 per cent of capacity. October's total included 6,268,102 tons of open-hearth steel, 387,933 tons bessemer, and 253,562 tons from electric and crucible furnaces. Distribution of last month's output was listed as follows by districts: Pittsburgh-Youngstown, 2,887,103; Chicago, 1,575,481; eastern, 1,321,823; Cleveland-Detroit, 539,175; southern, 314,126; and western, 271,889.

Blast Furnace Capacity and Production—Net Tons — OCTOBER - 1946

	Number of companies	Annual blast furnace capacity	Production							
			Pig Iron		Ferro manganese and spiegel		Total		Percent of capacity	
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Current month	Year to date
Distribution by Districts:										
Eastern	12	12,988,970	888,748	6,776,217	26,402	190,160	915,150	6,966,377	82.9	64.4
Pittsburgh-Youngstown	16	25,939,940	1,913,870	14,232,370	19,453	139,860	1,933,323	14,372,230	87.7	66.5
Cleveland-Detroit	7	6,557,500	513,036	4,030,085	-	-	513,036	4,030,085	92.1	73.8
Chicago	7	14,093,510	1,007,136	7,870,272	-	-	1,007,136	7,870,272	84.1	67.0
Southern	9	4,924,670	320,390	2,609,288	15,717	95,239	336,107	2,704,527	80.3	65.9
Western	5	2,836,000	109,809	965,853	-	-	109,809	965,853	45.6	40.9
Total	37	67,340,590	4,752,989	36,484,085	61,572	425,259	4,814,561	36,909,344	84.1	65.8

Rise in Nail Shipments Promises Early Relief in Acute Shortage

IF UNINTERRUPTED, the current high rate of nail shipments should in a few months relieve the acute shortage of this product, especially for the housing program, the American Iron & Steel Institute reported last week.

During September nail shipments were equivalent to the highest peacetime annual rate since 1923, when 789,000 tons of nails were shipped. The total for September at 59,875 tons represents an annual rate of shipments at approximately 720,000 tons.

A major reason for the current nail shortage has been the prolonged effect of the loss of over 50,000 tons of wire nail and staple production in early 1946 because of strikes. Since the strikes, nail shipments have fared relatively well in relation to other steel products.

Although the industry's potential steel production during the first nine months of 1946 was cut by 25 per cent due to strikes, nail shipments were only 6 per cent below the comparable months of 1945 and 1940.

The industry shipped 423,284 tons of nails during the first nine months of 1946, compared with 450,038 tons shipped during the like interval of 1940, and 449,074 tons for the first nine months of 1945.

Under a recent order, the government is setting aside one-half of the weight of each shipment of housing-type nails received by suppliers to fill rated orders.

Fabricated Structural Steel Shipments Show Increase

Shipments of fabricated structural steel rose in October to the second highest level of this year, 149,273 tons, compared with the year's high of 157,510 tons in August. September movements totaled 141,933 tons.

Total shipments for the first ten months of 1946 were 1,236,805 tons, compared with the average of 1,215,089 tons for the corresponding period of 1936-40, the American Institute of Steel Construction, New York, reported.

During October, new orders were booked for 138,953 tons, an increase over September bookings of 114,295 tons. Bookings for the first ten months totaled 1,523,445 tons, a 23.2 per cent increase over the average of 1,236,426 tons booked in the corresponding period of 1936-1940.

Backlog of orders for structural steel to be fabricated within the next four months aggregated 659,924 tons in October, a decrease from the 682,332-ton backlog a month previously. With the exception of the first two months of the year, backlogs in 1946 have been above the 600,000-ton mark. In October last year the backlog was 282,826 tons.

Steel Products Shipments Total 4,994,377 Tons in September

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period SEPTEMBER-1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	xxxx	xxxx	xxx	365,782	177,957	xxxx	xxx	2,601,393	1,198,424
Structural shapes (heavy)	12	2	9,421,550	355,261	48.8	347,144	xxxx	2,420,368	36.4	2,427,346	xxxx
Steel piling	4	3		22,200		20,739	xxxx	144,627		127,350	xxxx
Plates (sheared and universal)	29	4	17,080,770	415,352	29.6	417,492	20,288	3,056,338	23.9	3,034,021	197,464
Skelp	6	5	xxxx	xxxx	xxx	44,703	22,626	xxxx	xxx	293,721	135,805
Rails—Standard (over 60 lbs.)	4	6	3,657,000	187,255	62.4	186,692	xxxx	1,258,136	46.0	1,222,222	xxxx
—All other	5	7	392,000	13,886	43.1	12,536	xxxx	107,041	36.5	107,740	xxxx
Splice bars and tie plates	13	8	1,745,960	60,557	42.2	60,910	xxxx	448,218	34.3	472,199	xxxx
Track spikes	11	9	349,400	12,650	44.1	12,630	xxxx	98,587	37.7	103,626	xxxx
Hot Rolled Bars—Carbon	34	10	xxxx	646,917	xxx	524,403	72,390	* 4,901,070	xxx	* 3,994,413	503,383
—Reinforcing—New billet	15	11	xxxx	98,324	xxx	105,742	xxxx	684,217	xxx	743,072	xxxx
—Rerolled	12	12	xxxx	11,682	xxx	13,023	xxxx	101,116	xxx	102,815	xxxx
—Alloy	24	13	xxxx	181,571	xxx	157,672	12,002	* 1,237,617	xxx	* 1,037,305	92,794
—Total	41	14	22,326,160	938,494	51.2	800,840	84,392	* 6,924,020	41.5	* 5,877,605	596,177
Cold Finished Bars—Carbon	24	15	xxxx	120,227	xxx	120,021	xxxx	928,264	xxx	922,941	xxxx
—Alloy	23	16	xxxx	18,794	xxx	16,743	xxxx	159,855	xxx	142,577	xxxx
—Total	31	17	2,851,510	139,021	59.4	136,764	xxxx	1,088,119	51.0	1,065,518	xxxx
Tool steel bars	19	18	262,810	8,138	37.7	7,782	xxxx	* 74,972	38.1	* 72,246	xxxx
Pipe & Tubes—Butt weld	14	19	2,215,520	139,174	76.5	121,752	xxxx	1,002,097	60.5	943,106	xxxx
—Lap weld	9	20	730,200	23,682	39.5	24,565	xxxx	198,686	36.4	214,813	xxxx
—Electric weld	10	21	1,536,900	75,447	56.8	66,154	xxxx	552,831	48.1	474,490	xxxx
—Seamless	13	22	3,169,600	211,384	81.2	183,980	xxxx	1,569,541	66.2	1,380,699	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	9,837	xxxx	xxxx	xxx	67,786	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	40,065	xxxx	xxxx	xxx	311,649	xxxx
	26	25	7,293,670	412,640	68.9	98,595	30,685	3,141,157	57.6	745,427	255,781
Wire rods	41	26	5,742,890	325,111	69.0	186,315	13,012	2,485,755	57.9	1,435,208	101,411
Wire—Drawn	19	27	1,259,760	57,959	56.0	59,875	xxxx	423,284	44.9	423,879	xxxx
—Nails and staples	16	28	543,010	17,508	39.3	18,217	xxxx	152,271	37.5	150,979	xxxx
—Barbed and twisted	16	29	1,121,060	33,734	36.7	35,063	xxxx	277,197	33.1	278,248	xxxx
—Woven wire fence	13	30	149,700	9,801	79.7	10,258	xxxx	65,716	58.7	68,971	xxxx
—Bale ties	9	31	xxxx	xxxx	xxx	56,011	110	xxxx	xxx	530,965	1,277
Black Plate—Ordinary	8	32	465,000	6,937	18.2	7,570	xxxx	92,506	26.6	91,416	xxxx
—Chemically treated	9	33	3,758,850	167,981	54.4	169,349	xxxx	1,323,274	47.1	*1,413,375	xxxx
Tin and Terne Plate—Hot dipped	9	34	2,231,850	77,869	42.5	74,181	xxxx	646,282	38.7	655,040	xxxx
—Electrolytic	31	35	19,735,320	1,297,287	79.9	607,419	36,629	9,785,702	66.1	* 4,387,709	296,722
Sheets—Hot rolled	14	36	7,309,460	503,540	83.9	371,840	xxxx	3,907,721	71.5	* 2,820,756	xxxx
—Cold rolled	16	37	2,924,130	119,118	49.6	133,378	xxxx	1,020,077	46.6	1,054,251	xxxx
—Galvanized	27	38	7,180,030	241,586	41.0	156,139	18,776	1,741,952	32.4	* 1,104,732	176,775
Strip—Hot rolled	34	39	3,067,450	122,915	48.8	114,760	xxxx	949,238	41.4	* 920,101	xxxx
—Cold rolled	5	40	315,400	22,132	85.5	22,970	xxxx	173,788	73.7	178,799	xxxx
Wheels-(car, rolled steel)	6	41	398,170	12,198	37.3	11,419	xxxx	92,608	31.1	88,929	xxxx
Axles	3	42	169,510	3,740	26.9	653	xxxx	31,913	25.2	4,233	xxxx
All other	143	43	xxxx	xxxx	xxx	4,994,377	404,475	xxxx	xxx	37,150,548	2,959,835
TOTAL STEEL PRODUCTS	143	44	64,648,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Effective steel finishing capacity	143	45	xxxx	xxxx	xxx	66.2%	xxxx	xxxx	xxx	74.1%	xxxx
Percent of shipments to effective finishing capacity											

Tool Output Seen Hit by Coal Strike

Components shortages expected to be intensified should miners' walkout be prolonged. Shipments score again during October

NEAR TERM outlook for the machine tool industry has been darkened by the work stoppage in the soft coal mines but if another round of wage demands ensues from the miners' strike there is a good possibility that demand for machine tools as a means of cutting production costs will be spurred.

Throttling of industry generally by the coal stoppage would impede the building of machine tools. All year the machine tool industry has been handicapped by various shortages, notably of motors, electrical controls, castings, and pipe fittings, and a coal strike would delay improvement in the supply of these items.

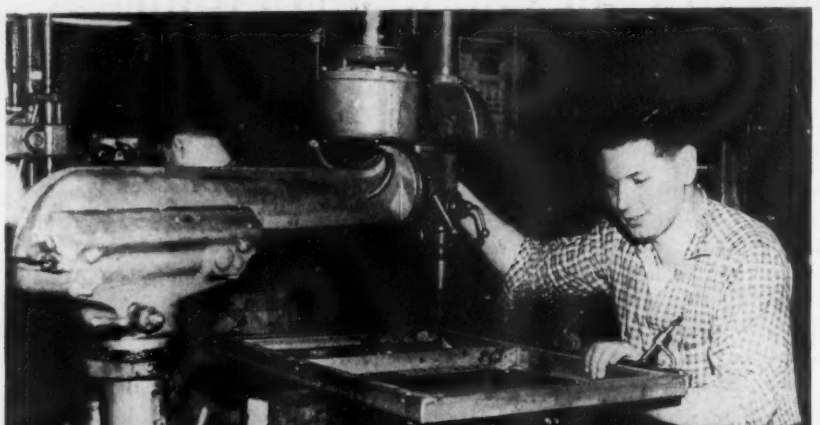
Some improvement was shown, however, in shipments of the machine tool industry in October when the estimated value, according to the National Machine Tool Builders' Association, Cleveland, totaled $28,935,000 compared with $25,468,000 in September. Peak month of the first ten months this year was January, when total industry shipments were estimated at $30,263,000.

Not only is the near term outlook darkened by the coal strike but a downtrend in the monthly volume of new orders placed for machine tools presages a future weakening in production. Since April, new orders have shown a month-to-month decline, the latest recession putting October approximately 2.1 per cent under September.

Along with the decline in new orders, the backlog of unfilled orders has been dropping month to month since July. The October backlog was 2.3 per cent smaller than that of September.

The increase in total shipments in the machine tool industry in October was accompanied by a 44 per cent increase in shipments on foreign account. In fact, the October foreign shipments were exceeded this year only by those in January.

New foreign orders in October rose 20 per cent above those of September.



PEACETIME APPLICATION: Framework for a Geiger-Counter x-ray spectrometer is being fabricated at the Mt. Vernon, N. Y., plant of North American Philips Co Inc. These instruments, of great value in atomic research that preceded the Hiroshima attack, are now being produced for peacetime analysis work in widely scattered fields

While new foreign orders showed an increase in October over September they were exceeded 20 per cent by foreign shipments, with a result that the excess of shipments was responsible in large degree for a 2.5 per cent decline in the backlog of foreign orders. Cancellations of foreign orders showed an increase and figured also in the reduction of the backlog.

Metal Price Control Continues in Canada But Steps Are Taken To Up Export Prices

TORONTO, ONT.

WHILE the Canadian government continues price controls and ceiling prices on the majority of articles and materials, especially iron and steel and nonferrous metals and their manufactures, action has been taken which will give primary producers of nonferrous metals higher prices for metals in manufactured form in the export markets.

A new order, No. 665, issued by Wartime Prices & Trade Board, provides that a group of 42 Canadian consumers of copper, lead and zinc now are required to make formal contracts with primary metals producers covering export of these metals in secondary, scrap or manufactured form.

Under the new order, the listed firms are required to make monthly returns covering such exports and must pay a premium on all nonferrous metals used in articles of export. This premium represents the difference between Canadian ceiling prices and the world prices.

Also, all other companies that use nonferrous metals and export them in any form are required to pay to the Export Permit Branch of the Department of Trade & Commerce, the difference between Canadian ceiling price and the world price on any metal used. The machinery to take care of the latter group of users will operate through the Commodity Prices Stabilization Corp., which is authorized to subsidize Canada's seven primary producers for metals purchased by other than the 42 companies named, and subsequently exported.

The primary producers named in the new order are: International Nickel Co., Noranda Mines, Hudson Bay Mining & Smelting Co., Waite Amulet Mines, Sherritt Gordon Mines, Normetal Mining Corp., and Consolidated Mining & Smelting Co. of Canada.

Following are the 42 companies named which must make formal contracts with the above primary producers: Anaconda American Brass Ltd., B. C. Metals, Bar-

ber Die Casting Co., Beatty Bros. Ltd., Boston Insulated Wire & Cable Co., Burgess Battery Co., Cables, Conduits & Fittings Ltd., Canada Metal Co. Ltd., Canada Wire & Cable Co., Canadian Bronze Powder Works, Canadian General Electric Co., Canadian Locomotive Co., Canadian National Carbon Co., Canadian Triangle Wire & Cable Co., Canadian Tube & Steel Products Ltd., Carter White Lead Co. of Canada Ltd., Dominion Foils (Canada), Dominion Steel & Coal Co. Ltd., Exide Batteries of Canada Ltd., Federal Wire & Cable Co. Ltd., Frost Steel & Wire Co., General Dry Batteries of Canada Ltd., Globelite Batteries Ltd., Gould Storage Battery Co., B. Greening Wire Co., Hart Battery Co. Ltd., Industrial Electric Products Ltd., A. C. Leslie & Co., McArthur, Irwin Ltd., Metal & Alloys Ltd., Montreal Locomotive Works, Mount Royal Metal Co., Northern Electric Co., Page-Hersey Tubes Ltd., Phillips Electric Works Ltd., Prest-O-Lite Battery Co., Schultz Die Casting Co. of Canada Ltd., Steel Co. of Canada Ltd., Tri-Sure Products Ltd., Willard Storage Battery Co. of Canada Ltd., Zinc Oxide Co. of Canada Ltd.

The actual list of items covered in the new order, for companies other than those listed above, are:

1.—Primary nonferrous metals; 2.—Secondary nonferrous metals (scrap); 3.—Alloys and mill products; 4.—The following when more than 25 pounds of any one metal is used: Wire cloth screen; locks and parts, where the major component is brass, bronze or zinc; valves and parts, where the major component is brass or bronze; stoves, lamps and parts; die casts and all die cast products; water, gas and electric meters; electric motors and generating equipment; electric transformers; bare and insulated electric wire and cable; key blanks; metallic foil; bolts, nuts, nails, grommets, rivets and burrs, of copper or brass; castings and bushings, finished or unfinished of copper, brass or bronze.

Copper producers in Canada, working jointly, have entered into an agreement with the British Ministry of Supply, whereby during 1947 the latter will purchase 75 per cent of Canada's exportable surplus of refined electrolytic copper.

Foundry Conference Well Attended in Chicago Area

Approximately 400 foundrymen of the Chicago area participated in the Regional Foundry Conference held at Hotel Continental, Chicago, Nov. 21-22.

The meeting, sponsored by the Chicago and Central Illinois chapters of the American Foundrymen's Association in co-operation with the Illinois Institute of Technology, Northwestern University and the University of Illinois, included 12 technical sessions devoted to various phases of foundry practice.

Earl L. Shaner, president, Penton Publishing Co., Cleveland, and editor-in-chief, STEEL, addressed the conference at one of the luncheon meetings.

Quonset Huts Are Feature Of Navy Exhibit at Show

Adap.ability of steel for construction of buildings for industrial, commercial, farm and emergency housing purposes was adequately demonstrated at the National Aircraft Show which closed in Cleveland Nov. 24 after a 10-day run.

At the Naval exhibit, three Quonset huts were set up to show how this branch of the armed services uses them for medical, shelter, photographic and theatrical purposes. Each of the huts was 20 feet wide, two 36 feet long and the third 24 feet long. They were loaned to the Navy by the Cleveland Builders Supply Co., Cleveland dealer for the Great Lakes Steel Corp., Stran-Steel Division, which manufactured them for the Navy during the war.

The aircraft show, held in a huge wartime bomber plant at Cleveland airport, attracted more than 165,000 visitors.

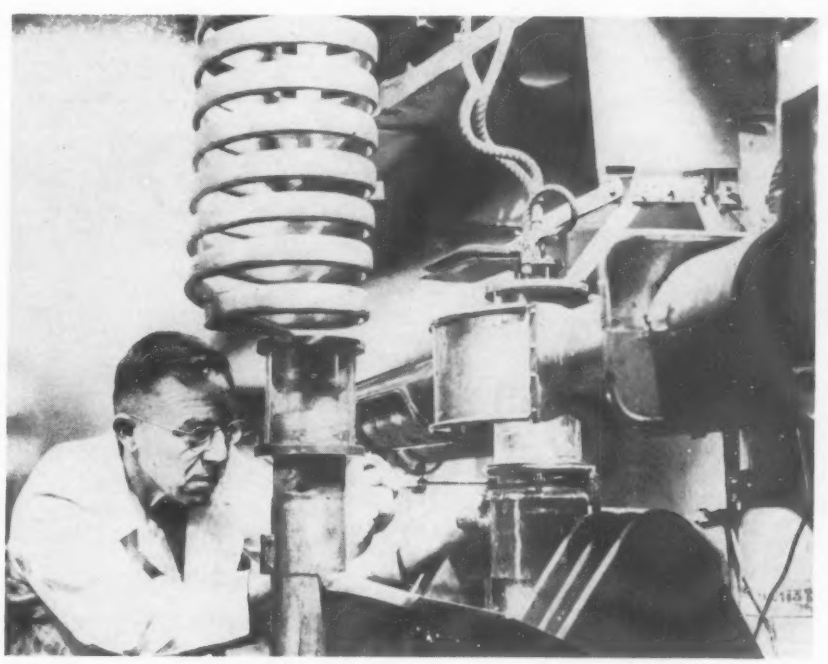
Pittsburgh Plus Arguments Seen Again Delayed

U. S. Steel's appeal from FTC order not likely to come up until next fall. Court instructs on procedure at hearing

ARGUMENTS in the long-standing case of the United States Steel Corp. against the Federal Trade Commission in which it seeks relief in the latter's order on Pittsburgh Plus pricing are not likely to start until early next fall.

On Nov. 22, attorneys for U. S. Steel and the FTC appeared before the Third Circuit Court of Appeals at Philadelphia but the court simply instructed them on how to prepare for actual arguments in the case. U. S. Steel was given four months in which to decide which portions of the record to have printed for use in the arguments while the FTC was given two additional months to check the steel corporation's proofs.

The next step will be the beginning of oral arguments before the court in Philadelphia but it is unlikely these can be started before next fall.



ENERGY SOURCE: A giant oscillator, built fundamentally like that in a radio but more than 50,000 times as powerful, supplies energy for the 100-ton cyclotron at Washington University, St. Louis. Here a machinist works on a section of the oscillator, which is located 65 feet away from its control board, behind concrete bulwarks because of the dangerous radiations given off when the atom-smasher is in operation. NEA photo

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Written suggestions from business and industry on matters to be considered in connection with trade treaty program with 18 countries must be in by Dec. 21, State Department announces. Oral hearings begin Jan. 13

STATE Department has set Dec. 21 as the deadline for submitting written suggestions to be considered in connection with the trade treaty program to be arranged with 18 countries in the near future.

Briefs may be filed by exporters, importers, manufacturers and other private business interests. They should be addressed to "The Chairman, Committee for Reciprocity Information, Tariff Commission Bldg., Eighth and E Streets N. W., Washington 25, D. C."

The same day has been set as the deadline for filing applications to be heard orally, and these applications also should be sent to the committee at the above address. The hearings, open to the public, will be opened at 10 a.m. Jan. 13, 1947, in the Department of Commerce Auditorium in the Commerce Bldg.

Subsequently some five or six hearings will be held simultaneously at locations to be announced later. Even with the arrangement for simultaneous sessions it is expected that three to five weeks will be required to give everybody a chance to speak his mind on trade matters.

After the hearings, the State Department economic staff will study the transcript of oral testimony and the typewritten or printed briefs. They expect to be ready by April of 1947 to begin negotiating with the foreign powers.

These are: Australia, Belgium, Brazil, Canada, Chile, China, Cuba, Czechoslovakia, France, India, Lebanon (Syro-Lebanese Customs Union), Luxemburg, Netherlands, New Zealand, Norway, Union of South Africa, Union of Soviet Socialistic Republics and the United Kingdom.

By order of Dean Acheson, the acting secretary of state, the department has mailed to several thousand interested business firms a list of products which will be considered for the possible granting of tariff concessions by the United States in these negotiations. The department is anxious to know to what extent, in the opinion of interested business concerns, such concessions can be granted with benefit rather than injury to the overall American economy. Copies of the list of products may be obtained from the Committee for Reciprocity Information, or from any of the field offices of the Department of Commerce.

PROBE: Photographed as they appeared at a Senate War Investigating subcommittee hearing in Washington in a probe of the leasing of the Dodge-Chicago plant are D. W. Holloman, left, Washington attorney, and Preston Tucker, Chicago, of the Tucker Corp., who leased the $170 million surplus war plant to build a new-type automobile. Another inquiry into the lease negotiations is being made by the House Surplus Property Investigating Committee. NEA photo

Digests of statistical, technical and trade information concerning each of the products listed for consideration for possible concessions when arranging agreements with foreign countries have been made available by the Tariff Commission. Requests for these data should be addressed to the secretary, United Tariff Commission, Washington 25, D. C.

State Department spokesmen point out that the program now being readied, which is the largest reciprocal-trade agreement negotiation yet undertaken, is to be based on terms incorporated in the International Trade Organization charter as proposed by the United States. This calls for specific deals "to reduce, modify, or eliminate barriers to trade, such as tariffs, quantitative restrictions, and discriminations." In other words, the State Department is acting in a give-and-take spirit in which there is no disposition to seek unfair advantages to the United States in international trade.

Both the British and French governments have gone on record as being in full agreement with the United States objectives. In other words, the spadework has been pretty largely completed, so that the invitations to submit briefs and appear at the hearings is the last chance that interested American businessmen will have to speak up in defense of their interests prior to execution of the projected treaties.

Americans, both in their briefs, and in their remarks at the hearings, it is expected, will indicate those American products on which the State Department should seek favorable import treatment from the 18 countries.

Other Information Available

In addition to the "List of Products of which Possible Tariff Concessions Will Be Considered," identified as Publication No. 2672 of the Department of State, interested businessmen who plan to submit briefs or speak at the hearings should obtain the following:

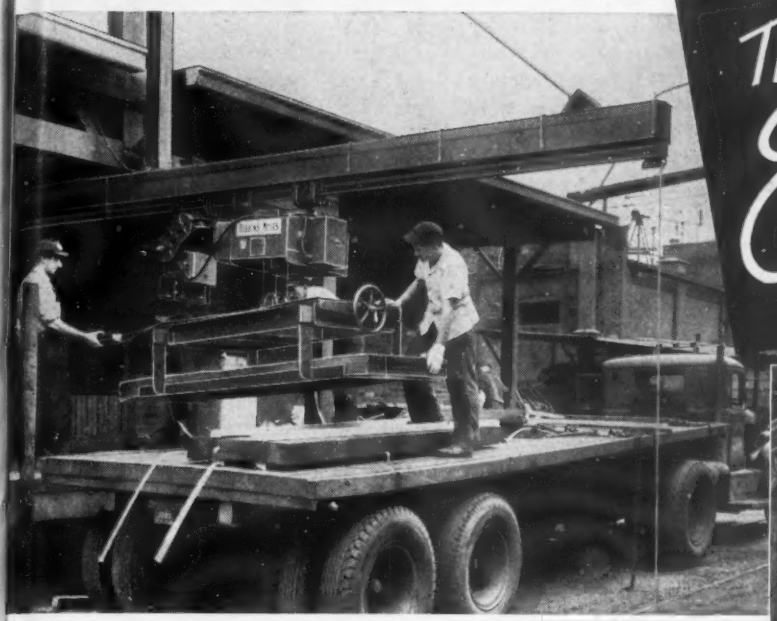
"Suggestions as to the Method and Character of Representations to the Committee for Reciprocity Information," available from the committee and at Commerce Field Offices.

"United States Import Duties, June, 1946, with Titles I and II of the Tariff Act of 1930, and Changes in Import Duties Since 1930," available at 70 cents a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., and also available at most Commerce field offices.

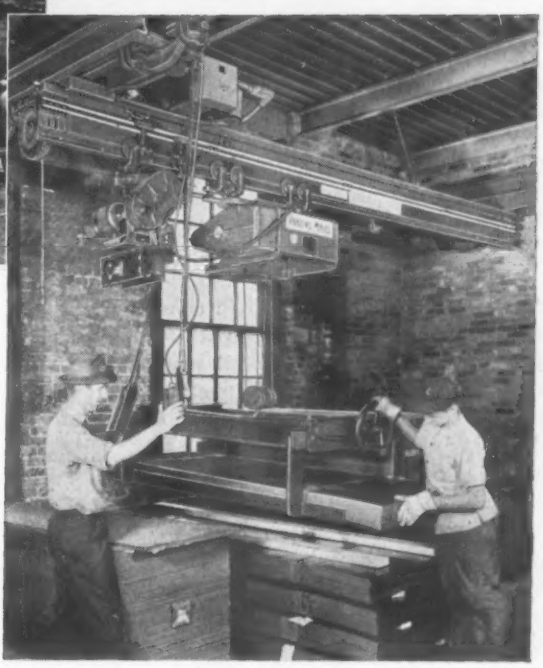
"Statistical Classification of Imports into the United States with Rates of

HANDLING STEEL

The Easy Way!

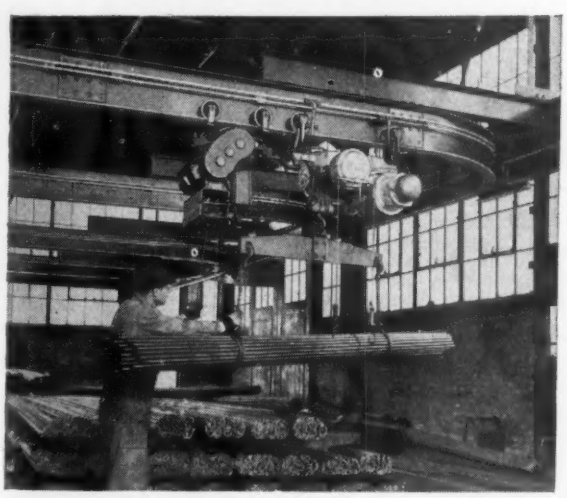


Power operated unit unloads steel by pushbutton control



Electric hoist with special hook, handles coils to process.

Power crane accurately spots 2-ton loads.



MonoTractor and 3-Ton hoist moves bar stock.

This tough job is made easy from start to finish —unloading stock from truck, to storage, to machines, to shipping—American MonoRail Systems, to fit any budget, afford faster handling, accurate spotting, reduced fatigue, added safety and greatly reduced damage.

American MonoRail Equipment saves one company $20 on every truck unloaded; another saved $150 in the first four months. With thousands of installations to draw from, American MonoRail Engineers are well qualified to offer solutions involving overhead handling equipment. This service is offered without obligation.

THE AMERICAN MONORAIL COMPANY

2117 HALSTEAD AVE. ● CLEVELAND 7, OHIO

Duty, Sept. 1, 1946, Edition," available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., also available at most Commerce field offices.

Surplus Disposal Headache

Recent hearings of the House Surplus Property Investigating Committee have made it clear why nobody stays long in the post of War Assets Administrator. The job is a mankiller, and a number of individuals have gone into rest and retirement after taking a turn at it.

Priorities difficulties, fights with other government agencies, continual needling from Congress, and failure to get the staff to obey the rules are guaranteed to shatter the strongest nerves in time.

One fact established in the hearings is that no matter what safeguards are set up by the administrator and his staff to prevent unwarranted profits being made out of government surplus property, they can be and are being circumvented. This was demonstrated in connection with numerous deals, particularly one involving the sale of 331 new power control units for use on tractors which had cost the government $238,320 at the OPA price of $720 each.

Instead of being sold as usable machinery they were disposed of as scrap at $16.59 per gross ton, which came to about $12 per power control unit. They promptly were resold, finally going to a tractor dealer who sold them for a total of $224,657.82—whereas the government had sold the lot, approximately 225 gross tons, as scrap for $3732.75.

It took the committee four days to develop the tangled story from various witnesses. A firm of scrap dealers originally purchased the units from the WAA Philadelphia office at $16.59 per gross ton in competitive bidding. After various succeeding transactions it appears the equipment ultimately was sold at approximately $500 each to machinery dealers throughout the country.

While testimony of the different witnesses was not in full agreement, here are some of the points brought out:

1—Whereas the original purchasing firm signed a scrap warranty when buying from the WAA, other witnesses testified that when they bought the material they knew its value to be much beyond that of scrap.

2—Two of them testified that whereas they paid the original purchaser $25 a ton, they paid part by check at the OPA price of $17 and part in cash.

3—These latter two witnesses also testified they purchased the entire lot of power control units from the original buyer from WAA at $25 per ton and resold it to a third company at $75. But when part of the lot had been delivered, the original purchasing firm stopped shipment and sold the remaining units to another party who thereupon collected $17,250 from still another buyer following which deliveries were completed. Thus the cost to the last buyer was approximately $53,250, but this he could afford to pay in view of the fact that he sold the units for $224,657.82, looking upon $17,250 payment as a "nuisance expense."

4—A memorandum signed by a former WAA employee in Philadelphia said the power control units were not suitable for use on standard tractors and hence had a limited market. This statement, the committee was told by R. H. Chiles, chief of WAA's Machinery Branch, Washington, was not true.

Counsel for the committee continues to study the case in an effort to decide what actions, and by what government agencies, it will recommend.

Other witnesses told the committee about instances where surplus machine tools were sold for a song as scrap. A WAA salesman at Philadelphia sold to a Philadelphia firm a Garvin milling machine. The buyer sent in a check for the amount of the Clayton formula price —$400. But the milling machine had disappeared. Subsequent investigation revealed it had been sold for approximately $25 as scrap. That was in the spring of 1946.

Another WAA salesman at Philadephia told the committee that last spring he sold a Cincinnati planer to a machinery company which sent in a check for $895, the Clayton formula price. This machine also had disappeared. Investigation revealed it had been sold as scrap for about $100; it was a very large planer.

Both of these machines were old. The planer was 34 years old. The witnesses thought, in view of this fact, that the WAA scrap panel may have had some justification for selling the machines as scrap. However, the testimony revealed that when the machines were sold as scrap, they were not removed from the list of surplus property available for sale. Whether this resulted from carelessness or some other cause the committee was unable to learn.

Buying Agency Gets New Name

The Treasury Department Procurement Division will have a new name starting Jan. 1, 1947—the "Bureau of Federal Supply." Reason for the change is that the division is the government's sole permanent peacetime agency devoted exclusively to purchasing, and does not buy only for the Treasury Department as many have believed. The division buys from all classes of producers in the United States and abroad. During the war it acted as purchasing agent for Lend-Lease and in that connection placed 93,000 contracts involving $6 billions. It now is acting, among many other programs, as purchasing agent for strategic materials for the national stockpile, under the direction of the Army & Navy Munitions Board.

In addition to purchasing activities, the bureau conducts a traffic service for the movement of government goods, a system of national warehouses to supply field units with commonly used items, a standards activity establishing uniform federal specifications and nomenclature of the thousands of items the government buys.

Clifton E. Mack, director of procurement, will have the new title of director, Bureau of Federal Supply.

Push Guaranteed Wage Study

No statement on the subject of guaranteed wage systems will be made in the near future by the Office of War Mobilization & Reconversion Advisory Board.

The board has just recevied its first report, an interim report from Murray Latimer, director of its Guaranteed Wage Study Staff. This report, according to George W. Taylor, chairman of the board, will be rounded out with illustrative material developed from special industry studies, as well as with some findings by Arthur S. Meyer, of the New York State Mediation Board, who has served the Guaranteed Wage Study Staff in an advisory capacity.

A second section of the overall study dealing with the economic effects of wage guarantees is yet to be submitted. It is being prepared under the direction of Profs. Alvin H. Hansen, Harvard University, and Paul A. Samuelson, Massachusetts Institute of Technology, Cambridge, Mass.

In addition, the Bureau of Labor Statistics is compiling a report on results of a questionnaire sent out to numerous companies in order to elicit full information about their systems.

The board, says Mr. Taylor, expects to submit a report to President Truman "sometime next year."

In the meantime, Dr. A. D. H. Kaplan of the Brookings Institution, Washington, is writing a report summarizing his studies of the whole subject of guaranteed wage systems and it is expected this will be published in book form early in January under the imprint of the Brookings Institution.

Personnel Management Stressed in Army's Officer Training Program

New course to rank as equal in importance with military studies. Undertaking springs from lessons learned in dealing with business during the war. Policy patterned on methods of training in private industry

BECAUSE the Army always has stressed the necessity of training its officers in the art of getting along with people, the latest self-improvement measure approved by the War Department is all the more significant. This is a top-to-bottom program of indoctrinating the entire Army in the use of the latest personnel management practices.

Under this program, already placed in operation, courses in personnel management will rank as equal in importance with the fundamental military courses. For instance, the reorganized Command and Staff College at Fort Leavenworth, Kansas, now has four schools: The School of Personnel, the School of Intelligence, the School of Combined Arms, and the School of Logistics. But each school will devote five weeks out of its 42-week period to instruction in basic personnel management. The School of Personnel, in addition, will devote an additional 10 weeks to highly-specialized courses entitled "Principles of Personnel Management," "Utilization of Manpower," "Human Relations and Leadership," "Statistical Techniques," and "Administration and Business Methods."

This new undertaking springs from the lessons learned by the Army during the war in dealing with industry, as well as in dealing with its own personnel. One of the lessons was that the great majority of successful companies in the United States pay fundamental attention to their personnel relations. Commenting on the new policy, Major General Willard S. Paul, the War Department's director of personnel and administration, points out that business leaders in the United States are focusing their attention as much on men as on methods. That is an example, he says, the Army proposes to follow.

"Business is finding means to provide in increasing measure the things every individual wants. Justice in terms of fair play and fair dealing, a sense of individual importance, opportunity and security. The management of men and the development of morale are so inseparably associated that they are properly considered as one," says General Paul.

"If business and industry have found it not only wise but essential to stress personnel matters to such an extent, it is doubly important that the Army not only does likewise but actually takes the lead. The War Department believes this is sound and correct thinking and intends to exert every effort in its power to see that it is done."

Col. James H. Banville, co-ordinator of the new program, makes clear that it springs from an increased appreciation of the need for making the most of the human material available to the Army. "The most valuable asset in any army," says Col. Banville, "without exception, is its personnel—which, furthermore, is the most difficult asset to secure and replace."

Colonel Banville lists the fundamental objectives of the training program as follows:

1—Get the right men in the right place by means of proper selection and assignment.

2—Increase his availability for work by controlling his absence from the job and by looking after his welfare.

3—Stimulate his will to work by creating the proper incentives.

4—Utilize him fully on essential tasks.

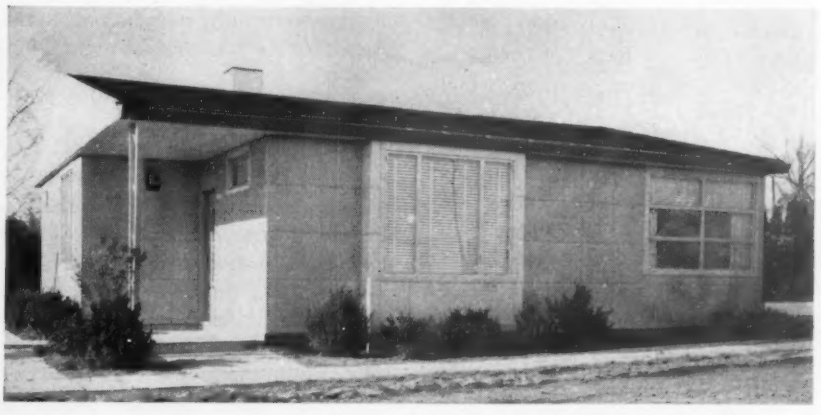
5—Increase his ability to produce by proper training.

The first need is to create a staff of specialists in personnel management. To this end the War Department has arranged to send 25 hand-picked officers to take one-year courses at colleges which have taken the lead in this subject. The five officers that get the most out of these courses will attend additional one-year courses. Then they will be assigned to the War Department General Staff where they will serve to perfect the Army's personnel management courses in Army schools. At this point they will make numerous contacts with industry, to observe at first hand the latest in personnel management techniques as developed by outstanding companies.

Co-operating Universities Named

The educational institutions to which the 25 carefully selected officers will be sent are: American University, University of Pennsylvania, University of Maryland, Stanford University, University of Washington, University of Minnesota, Ohio State University, University of North Carolina, Harvard University and Princeton University.

The schools at which the new courses will be instituted at once include, in addition to Fort Leavenworth, the United States Military Academy at West Point, the Officers' School at Fort Benning, Ga., and Fort Oglethorpe, Ga., the Armed Forces College at Norfolk, Va., and the Industrial College of the Armed Forces and the National War College at Washington, D. C. The course arranged for the latter two institutions will occupy 10 months. After the ground has been broken at these pilot schools, standard courses will be applied in supplementary and training schools at every post, camp or station in continental United States and overseas theaters.



MASS PRODUCED: This new, prefabricated, all-steel and porcelain enameled ranch-type house is being built by Lustron Corp. at the $170 million wartime Dodge-Chrysler plant, Chicago. At full production, 400 of these houses can be turned out daily, at a cost of approximately $7000 each. Acme photo

Shortage of Coal Acute In France

Production gains but industry's needs far from satisfied. Steps under way to effect economy program. Belgian steel output rises

OUTPUT of coal in France during the forty-second week of the year was a record since the liberation with 1,015,400 metric tons. The improvement was not due to an increase of production per man shift which has tended to decrease, but to an increase in the number of miners. However, tonnage available during the period was not as high as required, owing to a marked drop in imports.

The problem of fuel remains acute for French industry. The Comité Supérieur des Economies de Combustibles Minéraux, or council for the economy of fuel, which was formed in May of this year, has published its recommendations. These cover a considerable development of carbonization, which would result in an economy of 60 per cent of coal, taking into account the resulting byproducts. It is recommended that 27 million tons of coal should be carbonized each year, twice as much as in 1938, and 15 million tons would be for the iron and steel industry.

New Coke Ovens Planned

A plan is set forth providing for new coke ovens in the steelworks bringing the annual production of coke to 15 million tons. Blast furnace gas would be used for the coke ovens, and the richer gas would be used for the open-hearth furnaces. It is also proposed to increase the production of coke in the gas plants and to use high temperature ovens.

As another means of saving solid fuel it is planned to improve and extend the central power houses, and to intensify the use of electrical energy in railroads. The plan covers a period of five years. In the meantime the French National Railroad Corp. is going to substitute fuel oil for coal and 600 locomotives will be equipped with American burners, while 100 diesel-electric locomotives have been ordered from the United States.

HIT OF SHOW: A "hit" of the Paris Aviation Show was the French-built autogyro, shown surrounded by a sizable group of spectators. NEA photo

The Belgian iron and steel industry is continuing to improve. At the end of September, 30 blast furnaces were operating, as against 29 at end of August. Output of pig iron in September was 204,880 metric tons, against 191,180 tons in August, and the ouput of steel ingots and castings was 192,710 tons, while that of finished products was 162,250 tons against 146,950 tons in August. For the first nine months of the year production of pig iron was 1,521,140 tons against 410,010 tons in the corresponding period of 1945, and production of steel ingots and castings was 1,562,350 tons, against 352,990 tons. For finished steel the figures were 1,252,820 tons and 366,390 tons respectively.

Deliveries are still extended and export demand is very brisk but cannot be met entirely. The price of scrap is high and the position in this respect is difficult.

The agreement between Belgium, Luxemburg and Holland was to be applied on Nov. 1, but the necessity to revise customs tariffs and have these ratified by the respective parliaments is holding back the application of the agreement, although it is expected that it will be in force not later than Feb. 1, 1947. In the meantime the three countries are acting together in commercial negotiations with other countries, particularly in regard to iron and steel.

The program of Belgian and Luxemburgian exports for iron and steel has had to be curtailed. For December it is provided that 4500 tons of special shapes will be allocated to manufacturers of railroad trucks to be exported to France. In addition the French National Railroad Corp. is reported ordering 5000 trucks.

Negotiations are being conducted between Belgium, Luxemburg and France, covering the exchange of Belgian and Luxemburgian coal for French iron ore. The Belgo-Luxemburg union was receiving its supplies of ore from Sweden, but the recently arranged agreement between Sweden and Russia is likely to cause a reduction of supplies of Swedish ores to Belgium and Luxemburg and an increase of prices, so that French ores, whether they come from Lorraine or from Normandy, have become of much interest to the Luxemburgian and Belgian works.

FOREIGN NOTES...

Higher prices and longer delivery dates quoted by United Kingdom manufacturers on machinery for sale in India may lead to a shift of these buyers to suppliers in so-called "hard currency" countries, offering more favorable terms, according to Indian sources quoted by American authorities.

—o—

British and Canadian interests are making a bid for world markets in radio and radar through installation of the most modern types of this equipment in a converted bomber, which will tour Canada.

Progress Reported in Developing Program for Scrapping Vessels

Leasing of Mobile shipyard for shipbreaking sets pattern for utilizing similar properties. Negotiations on for leasing seven additional surplus yards in ship dismantling activities. Large tonnage of scrap expected to be generated

SHIPYARD at Mobile, Ala., operated by the Alabama Shipbuilding & Dry Dock Co. during the war, has been leased by the War Assets Administration to the Pinto Island Metals Co., Mobile, a new company, owned jointly by Alabama Shipbuilding and the M. D. Friedman Co., Portsmouth, O. On Nov. 17 the company began to dismantle ships previously acquired from the Maritime Commission for conversion to scrap.

The signing of the lease is of special significance because it establishes the pattern for similar deals involving the use of surplus shipyards for shipbreaking purposes. On the basis of preliminary negotiations to date, at least seven more shipyards will be leased for this purpose.

Altogether, as a result of the drive of the Shipbreaking Task Committee of the Civilian Production Administration, headed by Captain H. A. Ingram of the Navy, 14 yards have been made available by the Maritime Commission for shipbreaking and 8 by the Navy. Not all of them are likely to participate in the scrapping program since some are not favorably situated for this use.

Mobile Lease Sets Precedent

The Mobile plant is the second shipyard to be disposed of by WAA for shipbreaking purposes. Some weeks ago the Harrisburg Machine Co., Houston, Tex., leased the Todd yard at Houston for scrapping ships. However, that contract was worked up to suit the individual case. The Mobile lease which is to serve as precedent for future leases provides as follows:

The annual charges, payable monthly in advance, are: Land 1 cent per sq ft, piers 10 cents per sq ft, quays $3 per lineal foot, closed space 20 cents per sq ft, ways $2 per lineal foot, graving docks 25 cents per sq ft, drydocks $2 per ton of scrap, railroad trackage 10 cents per lineal foot along center line, gantry crane tracks 20 cents per lineal foot along center line, cranes fixed or on tracks $25 per ton of rated capacity, other machinery and equipment 6 per cent of the installed cost.

The rental calculated from the above charges shall constitute a minimum charge whether scrap is produced or not. The scrap produced shall establish rentals on the following basis: 40 cents per gross ton until the total minimum rental is achieved; 35 cents per ton up to a sum equivalent to the minimum rental times two; 30 cents a ton thereafter.

Shipbreaking got off to a slow start after V-J Day and the total scrap generated from this source up to Oct. 1, 1946, was 150,000 gross tons. As a result of the impetus provided by the CPA Shipbreaking Task Committee, the rate now is approximately 400,000 gross tons annually. At the expected rate of progress, barring the effect of possible upsets in the scrap market, shipbreaking by the end of 1947 should be yielding scrap at an annual rate of around 1 million gross tons.

Ships already available for sale for scrapping contain about 1,200,000 gross tons of metal. The extent to which this tonnage will be further increased by Maritime Commission offerings will depend on decisions still to be reached. The Navy, on the other hand, now has offered for sale all its vessels marked for scrapping, except the battleship *Oklahoma*, on which bids opened Nov. 26. The *Oklahoma* contains an estimated 20,800 tons of scrap.

Not all ships offered as surplus yet have been sold. On the basis of scrap contained, the Maritime Commission from V-J Day to Oct. 1 had offered 740,000 tons and sold 344,126 tons, while the Navy had offered 588,000 tons and sold 224,000 tons. Chief lot now pending was an opening by the Maritime Commission Nov. 6 and 13 on 41 ships containing an estimated 165,500 gross tons.

By far the greater portion of the shipbreaking program will continue to be carried on by the following established companies:

John J. Duane Co., Quincy, Mass.
Doan Salvage Co., Bordentown, N. J.
Northern Metals Co., Philadelphia.
Quaker Shipyard & Machine Co., Camden, N. J.
Patapsco Scrap Corp., Baltimore.
Boston Metals Co., Baltimore.
Potomac Shipwrecking Co., Pope's Creek, Md.
National Bulk Carriers Inc., Norfolk, Va.
Hyman-Michaels Co., Chicago.
Tampa Shipbuilding Co., Tampa, Fla.
Pinto Island Metals Co., Mobile, Ala.
Canal Salvage & Equipment Co., New Orleans.
Harrisburg Machine Co., Houston, Tex.
Learner Co., Oakland, Calif.
American Iron & Metals Co., Emeryville, Calif.
Oregon Steel Mills, Portland, Oreg.
Dulien Steel Products Inc., Seattle.

The following have bought ships and are preparing to scrap them, in most cases when facilities become available:

Lippsett Steel Products Co., New York. (Normandie).
Sun Shipbuilding and Dry Dock Co., Chester, Pa.
Luria Bros. & Co., Reading, Pa. (Is having its breaking done temporarily by the Quaker Shipyard & Machine Co., Camden, N. J.)
Newport News Shipbuilding & Dry Dock Co., Newport News, Va.
National Metal & Steel Corp., Terminal Island, Calif.
Heglo Sales Co., Hillside, N. J., in a working arrangement with the Franklin Iron & Metal Co., Hillside, N. J.
Florida Pipe & Supply Co., Jacksonville, Fla.
Zidell Machinery & Supply Co., Portland, Oreg., in a working arrangement with Oregon Steel Mills, Portland, Oreg.

South Chicago Steel Plant Bids To Be Opened Dec. 5

New bids for the purchase or lease of the government's $92 million steel plant in South Chicago, Ill., will be opened Thursday, Dec. 5, in Washington, War Assets Administration has announced. Republic Steel Corp., wartime operator, now occupies the plant under interim lease. Previous bids for the plant, received up to Sept. 30, were rejected by WAA.

Iron, Steel Industry Ranks Second as Electricity User

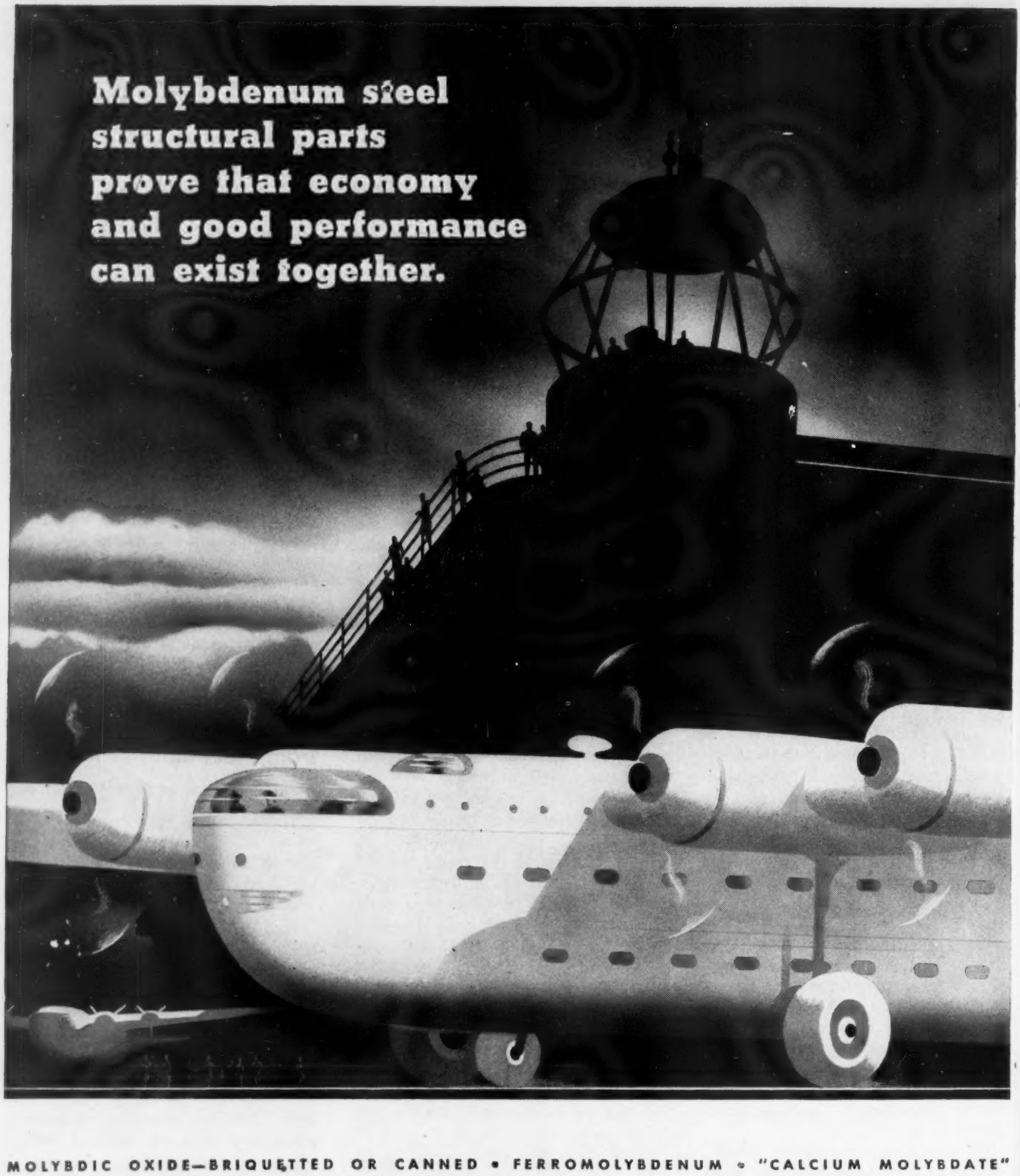
The iron and steel industry is expected to continue in second place this year in usage of electric power, according to the Federal Power Commission, Washington.

Anticipated total consumption of electric power in the iron and steel industry in 1946 is 19,405,503,000 kilowatt-hours, exceeded by only the chemical industry with an expected total usage of 21,565,205,000 kilowatt-hours.

In both 1944 and 1945 the chemical industry and the iron and steel industry held first and second places, respectively. The nonferrous metals industry places third for 1944, 1945 and 1946.

Electrical Engineering Show To Be Held in January

Visitors to the Electrical Engineering Exposition to be held in the 71st Regiment Armory, New York, concurrently with the winter convention of the American Institute of Electrical Engineers, Jan. 27-31, will view nearly 100 classifications of exhibits in the fields of electrical generating and power station equipment, transmission lines, substations, distribution and maintenance.



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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Automotive engineering seen facing challenge as admiring glances are cast at progress in technical development by aircraft engineers. Consumer pressure in competitive markets thought likely to spur innovations more than in past six years

IS THE automotive industry in a period of stagnation with respect to engineering development? That is a challenging question which would probably draw immediate and irate replies in the negative from most quarters but which, strangely and interestingly enough, is concurred in by some highly placed executives. The latter include those younger in years and in experience and they perhaps reflect the age-old dissatisfaction of youth with things as they are. Nevertheless, these nonconformists are in a position to do something about their opinions.

Their reasoning goes to the effect that it has become too easy to make money in building automobiles, speaking of course of the past 10 to 15 years and not of the past 12 months. When profits become too automatic, the spurs are withdrawn from engineering hides and progress lopes. Admiring glances are cast at rapid strides made in technical developments by aircraft engineers and speculation is heard as to whether possibly automotive engineers shortly may not have to take the bit in their teeth and accelerate the pace of engineering changes in automobiles.

Competition To Be Stimulant

Comparing automotive with aircraft engineering is not altogether fair. The former has moved forward rapidly under the lash of wartime emergency, and many of the ideas conceived in the past few years still have not appeared in completed airplanes. War pressures and consumer pressures are two entirely different things. Certainly consumer pressure on automotive engineering departments is going to build up enormously in the competitive markets of the next three or four years, which will stimulate automotive engineering more than has been felt in the past six years.

Recent rejuvenation, expansion and strengthening of the Ford engineering staff under Harold Youngren (whom some have called the top engineering mind in the business) seems to indicate the new management at the Rouge senses the profound importance of engineering development in the near future. Of course, the extension of Ford engineering activities started long before E. R. Breech and his cohorts descended on the company, but they have placed further emphasis in this direction which was not long in being revealed.

The two large engineering and research plants proposed by General Motors and Ford represent long-range steps in the direction of more rapid progress. Even though they have been tabled for the time being, they will eventually take shape and both should be fertile breeding grounds for new ideas and new principles in motor car design and construction.

Packard's George Christopher is a firm believer in spending large sums of money for engineering development, revealing recently his latest engineering budget was at least twice what it had ever been previously, constituting a principal portion of the $20 million which Packard currently is spending for overall expansion and development.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1946	1941
January	121,861	524,037
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,321
June	216,637	646,278
July	331,000	468,897
August	359,101	164,793
September	342,727	248,751
October	409,870°	401,369
Total, 10 mos.	2,501,752	4,532,512
Estimates for week ended:		
Nov. 9	92,760	96,585
Nov. 16	94,425	96,990
Nov. 23	94,973	80,820
Nov. 30	78,000	96,495

° Preliminary.

Grievance Procedure

Outlining grievance procedures under General Motors' union contract, H. T. Gierok of the corporation's labor relations staff, recently told a group of Detroit foundrymen that in general the adjustment procedure on grievances comprises four principal steps: 1. Presentation to the foreman; 2. appeal to the local plant management and the local shop committee; 3. appeal to a four-man appeal board made up of two representatives of the company management and two regional union representatives; and 4. appeal to an umpire whose decision is final.

Proper handling of a grievance when it is first presented to the foreman is the most important consideration of all, since grievances can be settled more readily at that time than later. Insofar as they are settled at that time, the cost of intervention by higher management is saved. Failure or success in this first step depends upon the relationship between the foreman and his subordinates. If he has their confidence and respect, his chances of success are good, otherwise, there is a temptation for the employer and the union committeeman to "bypass" the foreman and present the grievance to the superintendent or personnel officer.

Mr. Gierok laid down five basic points which all foremen might do well to remember. . . .

1. To prevent grievances it is important to find and eliminate their causes. Many issues are requests before they become grievances, and foremen should be on the lookout for suppressed grievances, such as a sullen manner on the job.

2. Requests can be made on almost any matter. A foreman's judgment and manner in dealing with requests thus can often prevent the written filing of many grievances.

3. The most common immediate causes of grievances are delayed action on requests, failure to give prompt consideration to requests, promises broken or unfulfilled, and incomplete explanations when employee requests are denied.

4. Snap judgments on requests should be avoided. Many grievances can be prevented if foremen think clearly of the consequences and implications of their decisions before making them.

5. A decision on an employee request should be in accord with the personnel policies of the company, the union agreement (if employees are organized) and the labor laws which apply to the operation.

The umpire machinery in the General Motors-UAW agreement has been functioning for more than five years. In that time, the umpires have handed down approximately 1000 decisions, supris-

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LUXURY LINER: First model of its intercity bus design has been delivered by Twin Coach Co., Kent, O., to American Buslines, Chicago. Dual engines double power output of ordinary engines without increasing weight. Hydraulic torque converters eliminate gear shifting, and torsilastic rubber springing "floats" the coach body. Twin Coach engineers say that because the bus can maintain private car speeds it is possible to reduce schedule time 10 to 15 per cent

ingly few when measured against the fact that over 100 bargaining units are involved and more than 250,000 employees. In a single year, about 35,000 written grievances are filed, most of which are settled on the basis of the foreman's answer at the first step, a relatively small number ever reach the umpire for decision—in 1944 a total of only 232, or 0.75 per cent of the written grievances filed during that year.

Incidentally, umpire opinions, 12,000 copies of which are printed for distribution after each decision, are in extensive use throughout GM plants as texts for sessions in foreman training. The corporation's labor relations staff is endeavoring through this medium constantly to better the handling of employee problems and, in effect to formulate the basis for common law in labor relations. The umpire system, which has worked reasonably well in General Motors plants as well as in Ford plants, is regarded by GM as a form of limited arbitration, much preferred to systems where all phases of employer-employee relationship are arbitrable.

Kaiser-Frazer Anniversary

Kaiser-Frazer Corp. began the second year of its occupancy of the former bomber plant at Willow Run, and celebrated the anniversary Nov. 20 by turning out 222 automobiles, as well as a large complement of roto-tiller machines, 13,000 of which have been built in the past eight months. A profit of $135,000 was realized on farm machinery business in October. A second body-in-white assembly line has started functioning as car assemblies move up, present production being confined to 4-door sedan models of the Kaiser and Frazer, with a five-passenger coupe scheduled to be added late next year.

By January the press division at the plant will be operating 21 new presses, ranging in capacity from 350 to 900 tons, producing fenders, hoods, floors, roofs and quarter panels, now purchased from outside fabricators.

Kaiser-Frazer has accumulated approximately $50,000 in a bonus fund for distribution to employees shortly before Christmas, under terms of an agreement with the plant union. The arrangement provides for setting aside $5 for each automobile and about $1.50 for each roto-tiller built during a year's time, to be distributed equally among employees. Current employment aggregates around 8000.

How Much Steel in a Ford

Latest compilation of steel requirements in the 1946 Ford passenger car shows a total of 2401 pounds, comprising 1000 pounds of cold-rolled material in body, hood and fenders, 680 pounds of hot-rolled steel, 37 pounds of cold-drawn bars, 25 pounds of terne plate, 48 pounds of special section in front axle and brake shoes, and 611 pounds of some 45 different types of steel in other parts of the car. The total, incidentally, represents the weight of finished steel in the car, not the bill of material on steel purchased per unit car, the latter figure being in excess of 3545 pounds for a typical 1942 model, according to the American Iron & Steel Institute.

New Ford Appointment

Appointment of M. E. Sheppard as general assistant controller of Ford Motor Co. to work under L. D. Crusoe, vice president and director of planning and control, reflects still another step to improve the organizational and production control setups at Ford plants, which have been some distance behind principal competitors in this activity. Mr. Sheppard was formerly general director of the Finance and Accountings Division for Fisher Body Division of GM and is succeeded there by C. V. Booth.

Packard Plans Are Extensive

Packard's President Christopher has been making a swing around various key points of the country and at each stop, in meetings with his dealer organization, he appears to have been able to break out with newsworthy comment, not at all untypical of Mr. Christopher. In Atlanta, for example, he said Packard would have a brand new model, from the wheels up, in production by March of next year, an announcement somewhat at variance with his comment in Detroit where he indicated a model changeover might be somewhat later than this date.

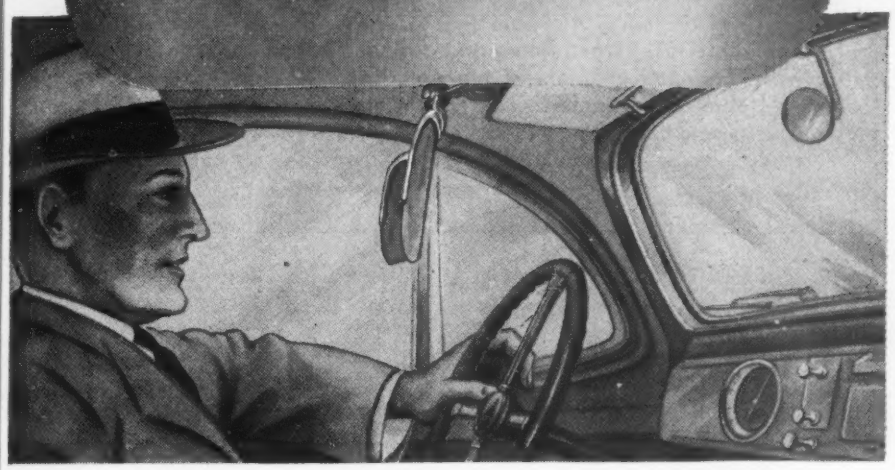
In Los Angeles he told of a different and more efficient type of turbojet engine for airplanes and guided missiles which Packard engineers have developed at the company's $3.5 million Toledo, O., experimental laboratory in co-operation with the air forces materiel command. About 600 specialists are at work in this laboratory under direction of Arthur Nutt. Production of the new turbojet engine is not yet in sight, but may be possible by next year.

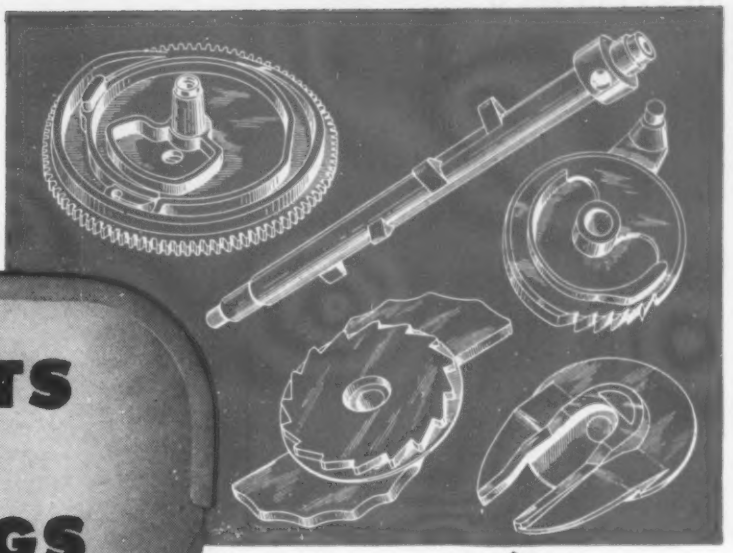
In San Francisco, Christopher disclosed his company has embarked on a $5 million peacetime marine engine program, one unit being a 6-cylinder 100-horsepower type and the other 8-cylinder 150-horsepower rating. Both engines have been tested thoroughly in the laboratory and one on the Great Lakes, being designed for use in cruisers, fast runabouts and workboats. Unusual feature is a hydraulically operated reverse gear built into each engine. First shipments of the new engines will be made in January, production program calling for six an hour.

Pointing to the fact that as of July, 1945, there were 376,302 federally numbered power boats in the U. S., the Packard chief said the horsepower of the new marine engines would put them into competition with those of other companies for about 17 per cent of the total boat engine market, but the possible dollar volume in this proportion would be about as much as in the remaining 83 per cent.

Some time next year, Packard hopes to be in production on a new line of trucks, 1½-ton and lighter, for distribution by its 2100 dealers.

TWO... MORE VIEWPOINTS ON DIE CASTINGS





COMPLEX CAMS ARE DIE CAST—IN ONE PIECE

Die castings offer extraordinary flexibility of design in producing pulleys, wheels, gears, ratchet elements, cams, etc. Consider, for example, the various types of *zinc alloy* die cast cams in the drawing above. Even track cams are readily die cast to size and there are numerous cases in which two or more cams, aside from such other parts as gears, bosses, pivot pins, stops, ratchet teeth and the like, are produced as integral parts of one casting. Important savings in machine work are realized when intricate cams are die cast to correct contour, for then they do not have to be machined individually.

In die casting the precision work is done on the die, and the thousands of castings produced in it have only minute variations in essential dimensions. If possible, cams which must be held within close dimensions should be so designed that, in die casting, flash will not occur on the working face or faces. This eliminates the possibility of affecting the accuracy of these surfaces in the flash removal operation.

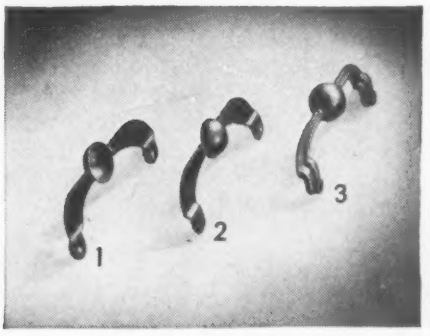
For additional data on die casting design ask us—or your die casting source—for a copy of the booklet shown below.

A POINT OF ECONOMY—ON A SUN VISOR

The polarizing sun visor pictured above and below is designed to be slipped over the visor which is standard equipment on all automobiles. The bracket for this visor features a universal joint type of construction to permit the visor to be flipped up out of the way when not needed. It is used for day driving only—to screen out disturbing reflected sun-glare.

As shown in the photograph at the left below, just two different *zinc alloy* die castings are required in this assembly. By mating a pair of the thin-sectioned bracket castings, both a channel for the wire visor clamp and a socket to house the ball on the shaft casting are formed. In the original design, the ball shaft was assembled by copper-brazing two mating stampings (#1 and #2 in the photograph at the right below). Conversion to a one-piece *zinc alloy* die casting (#3) eliminated this extra assembly operation and resulted in a stronger unit.

Does this die cast assembly suggest a means of solving a design problem or cutting production costs in *your* products?



Send for your copy

ZINC

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The Research was done, the Alloys were developed, and most Die Castings are based on

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Railroad Diesel Plant Projected By Fairbanks

Company plans more locomotive building facilities at its Beloit Works. Broad range of engine types to be made

PLANS to construct additional facilities at the Beloit, Wis., Works of Fairbanks, Morse & Co., for manufacture of railway diesel-electric locomotives were announced last week by C. H. Morse III, vice president in charge of manufacturing.

Erection of the new building, which will be 163 feet wide and 703 feet long, has been approved by the Civilian Production Administration.

The building will be one story, but 54 feet in height to meet the requirements of locomotive assembly. Interior equipment will include electric traveling cranes and other machinery required in construction of diesel locomotives ranging in size from 1000 hp switchers to 8000 hp road locomotives, both of which are powered by the opposed piston type of diesel engines.

The company has delivered diesel switchers to such well known railroads as the Milwaukee, Northwestern, Santa Fe, Monon and others. The company's large 6000 hp road locomotives are in service on the Union Pacific and the Chicago, Milwaukee, St. Paul & Pacific. Later this month the world's largest diesel locomotive ever built will be delivered to the Kansas City Southern Lines for freight service between Kansas City and New Orleans.

HOBART IS HOST: Open house and a dinner for members of the Dayton, O., and Cincinnati chapters of the American Welding Society was held by the Hobart Bros. Co., Troy, an early member of the society. Members and guests saw the Hobart plant producing arc welding machines, welding electrodes, motor generator sets, electroplating sets, air compressors, and battery charging equipment

Allegheny Ludlum To Open New Dayton, O., Warehouse

New warehouse equipped with the latest facilities for stocking tool steels and designed to serve southwest Ohio and Kentucky, will be officially opened Dec. 6 in Dayton, O., by the Allegheny Ludlum Steel Corp., it was announced at the company's executive offices in Pittsburgh last week by Russell M. Allen, vice president in charge of sales.

The brick and steel structure will house such specialties as tool steel bars, tool bits, and Carmet-tungsten carbide cutting tools and blanks.

Located at 1270 McCook Ave., the warehouse will serve to close the gap between the Allegheny Ludlum tool steel mill at Dunkirk, N. Y., and the company's customers in such cities as Cincinnati, Louisville, Columbus, Frankfort, Newport and Covington.

Operation will be under the supervision of R. J. Swan, district sales manager.

The design of the structure, Mr. Allen pointed out, permits simplified pick-up and delivery, and conforms to a specification plan that Allegheny Ludlum follows in construction of its warehouses.

The new building is the ninth in the steel company's chain of warehouses that stretches from Birmingham, Ala., to San Francisco, including Chicago, Cleveland, Detroit, Los Angeles, Springfield, Mass., and St. Louis.

Lone Star Steel Co. Enters Bid for Daingerfield Mill

Lone Star Steel Co., Dallas, Tex., has entered a bid of $1,625,000 for purchase of the government-owned steel plant at Daingerfield, Tex., which Lone Star has been operating, R. C. Cralley, regional real property director, War Assets Administration, has announced.

Bids for coal mines at McAlester and McCurtain, Okla., were received by WAA at the same time and brought offers of $625,000 from Lone Star, $237,000 from R. V. Lloyd and a lease proposal, Mr. Cralley stated.

Peter M. Chamberlain, bidding $125,000, was the only bidder for the Linden iron ore mines at Linden, Tex.

Bids will be sent to Washington for review, Mr. Cralley said, and added that successful bidders will be announced later.

Bureau of Mines Produces New Movie on Steelmaking

"The Drama of Steel," a sound motion picture tracing the history of steelmaking, has been produced by the Bureau of Mines and is ready for free distribution for showings to schools, industrial training groups, societies, etc.

On 16 mm film, the movie was produced in co-operation with a large steel manufacturer and was photographed in the company's mines and plants. Application for loans of the film should be addressed to the Graphic Services Section, Bureau of Mines Experiment Station, 4800 Forbes St., Pittsburgh 13.

Scrap Institute Announces Convention Committee Heads

Committees handling arrangements for the nineteenth annual convention of the Institute of Scrap Iron & Steel Inc., to be held at Hotel Commodore, New York, Jan. 6-8, have been announced by Joseph A. Moskowitz and Barney H. Rubine, chairman and co-chairman, respectively, of the general convention committee.

Chairmen and their respective committees are: Herman D. Moskowitz, reception; William Frost, registration and banquet; William Abramson and Frank Contey, entertainment; and Benjamin Schwartz who will handle publicity.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

American Stove Co., Cleveland, has purchased from Reconstruction Finance Corp. the government-owned plant No. 5 of Ohio Crankshaft Co. at 3802 Harvard Ave., Cleveland, for $517,500. The plant contains about 256,000 square feet of floor space.

—o—

Thomas Machine Mfg. Co., Pittsburgh, has begun a modernization program to increase its heavy machine tool production. Additional capacity will be used mainly to produce large steel fabricating machines and will afford greater facilities for the manufacture of machinery to customers' specifications.

—o—

William F. Klemp Co., Chicago, manufacturer of steel flooring, is now producing flexible steel grids, similar to those used by the Navy in constructing landing fields, to be used for factory flooring.

—o—

Westinghouse Electric Corp., Pittsburgh, has under construction a new $192,000 plant at Sharon, Pa., which will house development work on electric torpedoes for the Navy.

—o—

Carboloy Co. Inc., Detroit, has appointed Silliter-Holden Inc., Hartford, Conn., as a distributor for its carbide-tipped tools in Hartford and the north central Connecticut area.

—o—

International Nickel Co. Inc., New York, in co-operation with Stevens Institute of Technology, Hoboken, N. J., is sponsoring a course in metal fabrication and usage for its employees.

—o—

Pennsylvania Railroad, Philadelphia, and Union Switch & Signal Co., Swissvale, Pa., have developed a new type of portable telephone by which trainmen may talk to other members of the train crew, to crews of other trains in the area and to operators of nearby control towers.

—o—

Progressive Welder Co., Detroit, has established a process engineering department to provide engineering service where resistance welding is being considered as a means of fabrication.

—o—

Kelly Reamer Co., Cleveland, has appointed O. A. Muenz Co. as exclusive sales and engineering representative in lower New York state, northern New Jersey and Fairfield county, Connecticut. The Muenz company has offices at 239 Bloomfield Ave., Bloomfield, N. J., and at 932 E. Main St., Bridgeport, Conn.

—o—

Frigidaire Division, General Motors Corp., Detroit, expects to begin production of an electric washing machine about Jan. 1. Plans had originally called for production to start in October, but materials shortages have necessitated the delay.

—o—

Bunell Machine & Tool Co., Cleveland, has published three booklets dealing with the tool and die industry. They are: "The Captive Shop," "Let's Talk It Over," and "Obsolescence in Men, Methods, Machines."

—o—

SKF Industries Inc., Philadelphia, recently celebrated its 25th year of service to the railroad industry, and as part of the celebration displayed a spherical roller bearing which had traveled 2,879,000 miles on a Pennsylvania Railroad coach. The bearing was removed because of obsolescence of the truck assembly.

—o—

General Electric Co., Schenectady, N. Y., has opened a combined service shop and warehouse at 920 East Fort Ave., Baltimore, and a new service shop and warehouse at 3353 Larimer St., Denver.

—o—

American Chemical Society, Washington, has offered a contribution of $25,000 to the United Nations Educational, Scientific and Cultural Organization to pay expenses in this country of foreign chemists and chemical engineers who wish to engage in advanced study and could not do so without such aid. Persons to receive the grant will be designated by UNESCO.

—o—

Fruit Growers Express Co., Washington, has announced completion of a new experimental lightweight all-purpose railroad refrigerator car.

—o—

Rust Engineering Co., Pittsburgh, has been awarded a contract to design and construct a power plant, costing in excess of $1 million, for John A. Roebling's Sons Co., at Roebling, N. J. Contract calls for installation of three 80,000-lb per hour high pressure boilers with auxiliary equipment and one 4000 kw turbo-generator.

—o—

H. K. Porter Co. Inc., Pittsburgh, has moved its Quimby Pump Co. operations from plants in Newark, N. J., and New Brunswick, N. J., to Porter's plant in Lawrenceville, Pa.

—o—

Fageol Products Co., Kent, O., has established a marine division to handle sales and manufacture of marine engines, a new product for the company. Two Fageol marine engines, FM 200 and FM 225, will be introduced in January.

—o—

Luscombe Airplane Corp., Dallas, Tex., recently laid off approximately 400 employees as a result of changeover of production from 65 hp standard Silvaire planes to 85 hp deluxe Silvaires. As full production is attained it is expected that the majority of the employees will be recalled.

—o—

Dings Magnetic Separator Co., Milwaukee, recently consolidated all its manufacturing activities, which had been carried on in two plants, in a new plant, located at 4740 W. McGeoch St., that city.

—o—

Cameron Iron Works Inc., Houston, Tex., has closed its plant at 711 Milby St., that city, effective Dec. 2, and is now located at Katy and Silber Rds., Houston.

—o—

Brooks Oil Co., Pittsburgh, has recently completed a $35,000 laboratory at its Cleveland plant to increase facilities for research and testing of industrial lubricants.

—o—

American Machine & Foundry Co., Brooklyn, N. Y., has purchased the assets of Automatic Pinsetter Co., Camden, N. J. The Brooklyn company has previously developed an automatic pinspotter which performed all bowling alley pit services automatically.

—o—

Harris Seybold Co., Cleveland, has purchased a site opposite its plant which will be used for future expansion.

—o—

G. & A. Aircraft Inc., Willow Grove, Pa., subsidiary of Firestone Tire & Rubber Co., Akron, has changed its name to Firestone Aircraft Co.

—o—

Formica Insulation Co., Cincinnati, will open a new factory sales office at 3606 Commerce St., Dallas, Tex., on Jan. 1.

—o—

Geometric Tool Co., New Haven, Conn., has appointed Tool & Supplies Inc., St. Louis, as distributor for the St. Louis area.

Industry Curtailment Seen on Coast

Prolonged coal strike expected to force shutdowns though area operations are based largely on use of oil and gas for fuel

SAN FRANCISCO

ALTHOUGH the Far West is fortunate to have its industrial operations based on the use of oil and gas instead of coal as a fuel, nevertheless the coal strike threatens to have a widespread effect on this area's economy if the walkout is prolonged.

The western steel industry, of course, will be affected most quickly and directly by the strike. At the time the strike began Geneva Steel Co.'s mill in Utah had a supply of coal on hand sufficient to maintain operations until about Dec. 1. Beginning about Dec. 1 the Geneva plant will curtail sharply, and may close entirely if the strike shows signs of running over a lengthy period.

At the same time the Columbia Steel Co.'s operations in the San Francisco area, as well in other Coast regions where it operates, will be curtailed sharply as a result of the slackening of Geneva's production.

Columbia depends on Geneva for pig iron and in the current strike the effect of a Geneva reduction in pig iron supplies would be felt almost immediately. That's because Columbia's inventory of pig iron at present is very low in contrast with the last coal strike when pig iron supplies were relatively ample. One reason for the current reduction in Columbia's pig supply is the fact that a blast furnace at Ironton, Utah, has been closed for some time for relining.

Bethlehem Has Scrap Problem

Bethlehem Pacific Coast Steel Corp. for the moment is in a more favorable position than Columbia. The company relies almost entirely on scrap in its San Francisco bay plant and uses gas and oil in its furnaces. However, Bethlehem, too, eventually will be affected, it fears, if the scrap supply does not increase.

Indirectly, of course, many other industries will suffer the consequences of the coal strike, even though none may use coal directly in their operations.

For example, curtailment of railroad operations, which it is believed will result from the strike, will rob many manufacturing firms of components and materials needed for fabrication operations. Many of these items have been so scarce for so long it has been impossible to build up inventories. Therefore any curb on shipments will be felt quickly.

AIR DELIVERY: For use in making quick delivery of castings to customers, the Ace Foundry Ltd., Huntington Park, Calif., has purchased a Navion airplane from North American Aviation Inc., Los Angeles. Ace Foundry officials pictured with the plane are, left to right: E. G. Gaskell, treasurer; H. L. DeSantis, secretary; John DeSantis, sales manager; and W. A. DeSantis, president. John DeSantis will be the company pilot

Most householders on the Pacific Coast use gas or oil to heat their homes, and therefore they'll not be pinched for fuel as will eastern householders. Nevertheless many citizens will be affected by the strike because eventually it will mean the loss of their jobs.

For example, the Geneva plant expects to start cutting back its payroll of 5000 employees sometime between Dec. 1 and 10. Columbia Steel employs 2600 persons in the San Francisco area, and any curtailment in operations will increase the unemployment rolls. Foundries and steel fabricators also will curtail employment as they curb operations.

The General Motors and Ford assembly plants in the San Francisco area employ 4500 persons, a large number of whom will be laid off in a few weeks if the strike stretches out. The motor companies' supplies of parts and components are "lower than usual."

According to the latest report of the U. S. Employment Service there are only about 6500 unfilled job openings in San Francisco, of which 4100 are clerical positions. Moreover, most workers have a very slim margin of savings to tide them over an unemployed period. A recent survey by a labor union indicates that the average worker has less than $300 in the bank.

A reduction in motor freight rates on steel products moving from Geneva, Ogden, Provo and Salt Lake City, Utah, to San Francisco and Los Angeles has been put into effect. It provides for a

cut of 40 cents per 100 pounds under previous rates. A minimum truckload weight under the new rates is 35,000 pounds.

Products involved include iron and steel plates, sheets, structural shapes and bars.

The reduction had been proposed to the Interstate Commerce Commission by the Intermountain-Coast Motor Freight Traffic Bureau. The ICC allowed the rates to become effective without a hearing.

Coal Supplies in Pacific Northwest Area Limited

SEATTLE

Operations at Washington state's 44 coal mines ceased last week when miners failed to report for work.

Officials of Solid Fuels Administration estimate coal supplies in this area will last only 10 to 12 days. Some coal scheduled for export has been made available for local use but the shortage of fuel threatens foundry and cement plant operations. Steel industries will be affected but rolling mills report they have sufficient stockpiles to carry them over an emergency of reasonable duration.

Rolling mills are operating at near capacity, making every effort to reduce backlogs. Business for the first quarter is being taken in limited tonnages and with discrimination as operators hesitate to commit themselves under existing uncertain conditions.

Speaking before the National Grange convention here, Paul J. Raver, Bonneville power administrator, asserted the government's improvement in Columbia river projects was one of the soundest ever made by the people of this country.

As of June 30, 1946, the administrator gave $369,500,000 as the total investment in all phases of the Grand Coulee dam, Bonneville dam and transmission line and the Columbia Basin irrigation project. Of the total $275 million represents investment in power facilities at the two dams and in the transmission system.

Dating back to 1939, he said, total revenues for the ensuing period were $83,484,000 or nearly 25 per cent of the total expenditure to the end of the last fiscal year. Of this revenue $26,893,000 has been spent by Bonneville, Bureau of Reclamation and Army engineers in operation and maintenance of the power projects. Interest expense on power facilities totaling $28,702,000 has been set aside while $13,571,000 has been applied to depreciation and amortization of debt, leaving a surplus of $16,327,000 for advance amortization and contingencies.

California Auto Assembly Plant Expansion Programs Are Pushed

Expectations are facilities for turning out 650,000 cars annually in Los Angeles area will be available when present building programs are completed. Adjustments in district warehouse steel prices anticipated

LOS ANGELES

EXECUTIVES of southern California automobile assembly plants were guests last week of nearly 500 other business and industry leaders of the area under the aegis of the Chamber of Commerce of Los Angeles.

Figures made public at the meeting showed that automobile production in Los Angeles County will rise from the prewar 154,000 annually to 650,000, with 17,000 persons employed, when present expansions are complete.

These plans include a Chevrolet assembly plant at Van Nuys, to be in production by next summer with William Massey in charge; a Lincoln-Mercury plant in Maywood with George L. Bogg as division manager; a Nash factory in El Segundo and the Kaiser-Frazer plant at Long Beach.

Thomas P. Archer, General Motors executive, discussed the auto industry's current headaches in one of the principal talks at the meeting.

"The automotive industry, now producing only 70 per cent of its capacity, is being hamstrung by the policies of appeasement to pressure groups," he said. "These policies are erected on a foundation of something for nothing, more pay for less work and similar theories which strike at the very heart of free enterprise."

Mr. Archer named as necessary to high production and generally good business tax cuts, retirement of the government from business and restoration of a "normal, economic climate."

"Demand for goods and services are at an unprecedented peak," he said. "Unemployment is almost nonexistent. We have unequaled industrial facilities. We have the know-how and the business and mechanical skills to make a higher standard of living than any ever seen. I cannot believe that unthinking opportunists will be allowed to continue to hold top authority in this nation."

Several steel dealers described as "fly-by-night" by two Los Angeles jobbers, called on the trade in that city last week offering hot-rolled sheets, fob eastern shipping point, at prices approximately double the resale price on the coast. The would-be sellers demanded a deposit with orders, but found no takers.

Any adjustments in warehouse stock prices in the area will be downward, a leading southern California jobber predicted. Current listings have not changed since the termination of OPA control. Sheets remain the scarce item.

Following a run of active business in October, sales have fallen off slightly with the result that inventories on most items are increasing.

W. C. Mullendore, president, Southern California Edison Co., believes that many have "misinterpreted the quality of a demand that arises from the destruction of goods that never came to market."

In a talk before the National Association of Cost Accountants in Los Angeles, Mr. Mullendore said:

"We read that a great period of prosperity lies ahead because of the enormous 'demand.' This 'demand' is but a false label for a deficit, the meaning of which is but 'paying for dead horses.'

"No bolder or more flagrant violation of fundamental rights was ever countenanced by any civilized modern government than the outrageous wholesale violations of all laws against violence, conspiracy and even highway robbery which have not only been winked at and connived in by government agencies, but actually approved by the Supreme Court."

Caution in Business Advocated

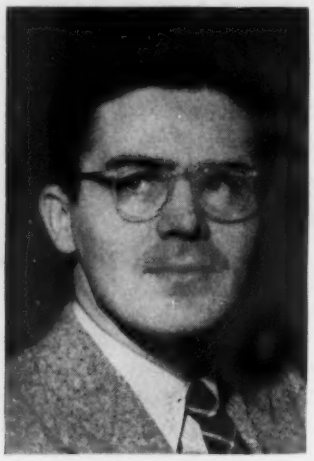
J. Hugh Jackson, dean of the School of Business at Stanford University, told the accountants: "Business should be cautious. It is not certain that as production increases consumer expenditures will similarly expand."

Verne Breitenbucher, Los Angeles accountant, declared that efficient management is the one commodity on which the East holds an advantage over the West, due to its long history of competitive experience.

The Los Angeles Marine Exchange reported that because of continuing strikes the flow of goods through Los Angeles Harbor dropped last month to a value of $9,179,386 from the monthly average of $15,447,337. The tonnage drop in the period was from the 222,688 average for September, August and July to 91,983 in October.

Men of Industry

J. MYLAN HARVEY



MURRAY C. SCOTT

W. E. GILBERT

J. Mylan Harvey has been transferred to the Cleveland field service staff, Hall Laboratories, Pittsburgh, subsidiary of Hagan Corp. Mr. Harvey, a service engineer for the company since 1939, was with the Pittsburgh staff. Working with C. H. Tate Co., Hagan representatives, he will handle water conditioning for industries in the Cleveland area. **Murray C. Scott**, of the Pittsburgh service engineering staff of Hall Laboratories, will soon be assigned to the West Virginia office of the organization, located at Huntington. He will aid **J. T. Waldron**, who has been handling sales and service in that territory for 2 years. Mr. Scott, who served with the Army during the war, joined the Hall staff last April. In his new position, he will devote his time to field service, relieving Mr. Waldron of part of that responsibility.

—o—

L. B. Perkins has been appointed assistant manager, and **F. J. Schmitt**, director of sales, D. A. Stuart Oil Co., Chicago. Mr. Perkins has been secretary-treasurer of the firm since 1944, and Mr. Schmitt had been sales manager since 1942. **C. N. Cox** has been appointed sales manager of the firm. He was with Archer-Daniels-Midland Co., Minneapolis. **J. E. McCoy**, formerly assistant to the sales manager of the Stuart company, has been appointed assistant to the director of sales.

—o—

Lincoln Electric Co., Cleveland, has announced the appointment of seven new welding sales engineers. **Marvin Anderson**, who served in the Army during the war, has been appointed to the Moline, Ill., office. **Albert Bavaria**, recently released from the Navy, has been appointed to the company's Philadelphia office. **Richard Freundlich**, another Navy veteran, has been appointed to the Cleveland office. **Paul Holden**, an Army veteran, has been appointed to the firm's Franklin, Pa., sales office. **Richard Nelson** has been appointed to the Syracuse, N. Y., office. Mr. Nelson joined the firm in 1938, in the Peoria, Ill., office and stockroom. He was transferred to the Chicago office in 1940, and remained there until January, 1943, when he enlisted in the Army. **Richard K. Reynolds**, recently released from the Navy, has been appointed to the Detroit office of Lincoln Electric Co. **John E. Williams** has been appointed to the Syracuse office. He joined the company in January, 1942, and entered the Army the following August. Mr. Williams was released from service last February, and resumed his duties with Lincoln.

—o—

Del Wakeman has been appointed advertising director, Ekco Products Co., Chicago, succeeding **James N. Krohne** who has resigned. Mr. Wakeman had been advertising and sales promotion manager, Magnavox Co., Ft. Wayne, Ind.

—o—

Raymond M. Page has been appointed manager of distributor sales, Fafnir Bearing Co., New Britain, Conn., succeeding the late **Stanley M. Prior.** Mr. Page joined the company in 1929, and for several years handled its sales in the Pittsburgh area. He was called to the main office 10 years ago, and for some time has served as assistant manager of distributor sales.

—o—

Dr. C. F. Goodrich, chief engineer, American Bridge Co., Pittsburgh, has retired after 40 years with that subsidiary of United States Steel Corp. He began work with the company in 1906 as a draftsman in the Trenton, N. J., plant, and became chief engineer for the firm in 1935. Dr. Goodrich was in charge of the designing and engineering for American Bridge in the building of the San Francisco-Oakland Bay Bridge. He was a national director of American Society of Civil Engineers from 1943 to 1945.

—o—

W. E. Gilbert has been appointed manager, Processing Equipment Division, sales department, Detrex Corp., Detroit. Mr. Gilbert joined Detrex in February, 1939, and was soon promoted to factory superintendent of the Dry Cleaning Division. Since 1941, he had been plant superintendent in charge of all equipment fabrication for the company.

—o—

J. Harper Claycomb has been elected treasurer, Cochrane Corp., Philadelphia. Before coming to Philadelphia in 1944, Mr. Claycomb was on the industrial engineering staff of Stinson Division, Wayne, Mich., Consolidated Vultee Aircraft Corp.

—o—

James P. Gill, vice president, Vanadium-Alloys Steel Co., Latrobe, Pa., received the honorary degree of doctor of engineering from the University of Missouri, at the recent 75th anniversary of the founding of the Missouri School of Mines and Metallurgy. Mr. Gill gave the annual Campbell Memorial lecture before the American Society for Metals in 1936, and in 1939 was elected national president of that organization.

—o—

H. B. Lilley has been appointed district manager, with headquarters in Houston, Tex., Steel & Tube Division, Timken Roller Bearing Co., Canton, O. His territory will include Texas, Louisiana, Arkansas, Oklahoma and Kansas. Mr. Lilley joined the Timken company

Speed Nuts*

Give You More Assembly Advantages

Than Any Other Nuts, Regardless of Price

PREVENT VIBRATION LOOSENING

SPEED NUTS prevent vibration loosening because they provide a *double* spring-tension lock that *absorbs* vibration instead of merely *resisting* it. Insures a tight attachment for the life of the product.

SPRING TENSION RESILIENCY

In the assembly of porcelain enamel, plastic or glass parts, SPEED NUTS provide the tension necessary for a tight assembly, yet are sufficiently resilient to prevent damage due to expansion and contraction, vibration or shock.

APPLIED FASTER

SPEED NUTS put wings on your assembly lines because they start easier, pull down faster and no wrench is required to keep them from turning. Made also for use with coarse-thread sheet metal screws, requiring fewer turns to tighten, for still faster application.

ELIMINATE LOCK WASHERS

You can boot lock washers out the window, for SPEED NUTS are self-locking. They cut both material and handling costs. Because of their wide bearing surface, SPEED NUTS also can eliminate the use of spanner washers.

SELF-RETAINING

Many types of SPEED NUTS lock themselves in screw-receiving position for "blind" location assembly, eliminating expensive welding, riveting or clinching operations.

PERFORM MULTIPLE FUNCTIONS

Like a one man band, many special types of SPEED NUTS perform multiple functions, replacing two or more parts. SPEED NUT prongs can be incorporated in almost any shape or form to do the job easier and faster.

LOCK ON UNTHREADED STUDS

"Push-On" SPEED NUTS need only be pushed over rivets, nails, tubing, or unthreaded studs to lock parts so securely, you can't wrestle them off. Costly threaded inserts, drilling and tapping are eliminated—molding costs reduced—assembly speeded up.

WILL NOT CLOG

Having no threads, SPEED NUTS cannot clog with paint. No assembly delay for re-tapping threads. This is particularly important where SPEED NUTS are permanently attached to parts for blind assembly.

WILL NOT "FREEZE" TO THREADS

Having no threads, SPEED NUTS will not "freeze" to rusting bolts. They can be easily removed at any time for servicing or replacing. You'll save the repair men a lot of cussing.

WEIGH LESS

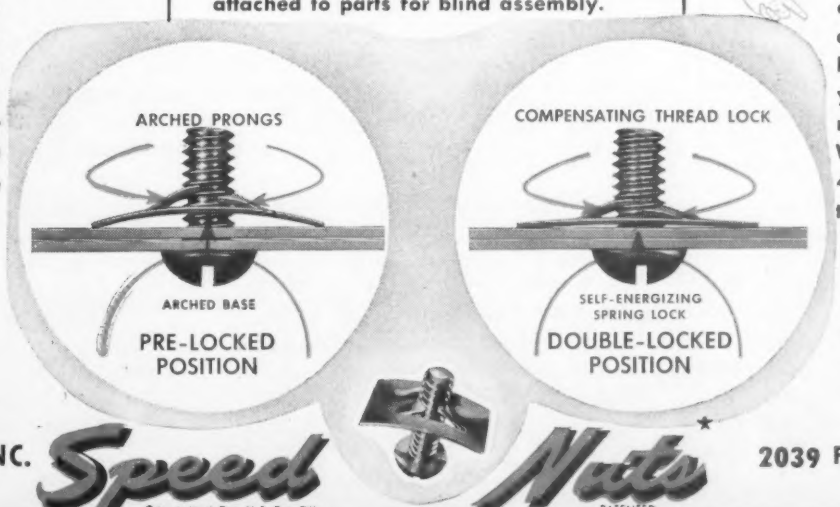
Because they are made of sheet metal instead of bar stock, SPEED NUTS are in the "featherweight" class compared with threaded nuts. By eliminating lock and spanner washers and other unnecessary parts, weight is reduced still further.

MINIMIZE SHIPPING DAMAGE

SPEED NUTS give you free insurance against shipping damage. They provide a resilient lock that defies loosening and prevents cracking of enamel and glass. With SPEED NUTS, your products will reach your customers in perfect condition.

SEND TODAY

We're not fooling about these advantages. They are very real and worth-while as any SPEED NUT user will tell you. Rush your assembly problems to us now, giving complete details. We'll show you which of the 4000 shapes and sizes will do the trick for you.



IN CANADA:
Wallace Barnes, Co., Ltd.
Hamilton, Ontario

IN ENGLAND:
Simmonds Aerocessories, Ltd.
London

IN FRANCE:
Aerocessoires Simmonds, S. A.,
Paris

IN AUSTRALIA:
Simmonds Aerocessories, Pty. Ltd.,
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Speed Nuts* — PATENTED

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FASTEST THING IN FASTENINGS . . . MORE THAN 4000 SHAPES AND SIZES

in 1925. Until 1944, when he joined the steel sales department, he was in the inspection engineering department of the Steel & Tube Division where he became assistant chief inspection engineer, developing methods and standards for the production and inspection of steel tube mill products. His chief duty, since joining the steel sales department, has been the development of new applications for seamless mechanical tubing. **Elmer Anderson** has been appointed assistant service manager of the Timken Canton office. He joined the firm in 1929, and had been service engineer in the Milwaukee office since 1933.

—o—

Peter B. Payne has been appointed general manager, John B. Salterini Co., New York. Mr. Payne, an industrial engineer, was on the supervisory staff of Corrigan, Osburne & Wells, New York. He will remain on the staff of that firm as a consultant.

—o—

F. P. Schneider has been elected president and general manager, Velsicol Corp., Chicago, succeeding Julius Hyman, executive vice president, who recently resigned. Mr. Schneider had been secretary and treasurer of the firm since its founding in 1931. Previously he had been in the paper manufacturing and oil refining fields.

—o—

Dr. Edwin E. Whitehead has been appointed secretary of the Midwest Power Conference, which will be sponsored next March 31 through April 2 by Illinois Institute of Technology, in co-operation with other midwestern colleges and universities, as well as engineering societies. Dr. Whitehead was recently appointed research professor in the electrical engineering department of Illinois Institute of Technology.

—o—

Harry Temporal has been placed in charge of the recently reopened Chicago office, Farrel-Birmingham Co. Inc., Ansonia, Conn. Mr. Temporal has been with the company for 26 years, having first joined Farrel Foundry & Machine Co. at Ansonia in 1910. He was formerly Chicago office manager. Mr. Temporal was in charge of company branch offices in Cleveland and Akron, and served in the sales departments in Ansonia and Buffalo.

—o—

A. F. Franz has been elected vice president in charge of operations, Colorado Fuel & Iron Corp., Denver. He succeeds **Robert T. Dunlap,** who has resigned. Before becoming superintendent of the Buffalo plant of the corporation's Wickwire Spencer Steel Division, Mr. Franz was with Alan Wood Steel Co., Conshohocken, Pa. He was appointed works manager of the Colorado Division of Colorado Fuel & Iron Corp. last March, following the death of **L. F. Quigg.** In his new position, Mr. Franz will have complete charge of all operations of the corporation, and for the present will maintain his headquarters in Pueblo, Colo.

—o—

Francis L. Quinlan has been appointed to the newly created post of public relations manager, Fafnir Bearing Co., New Britain, Conn. **Truman L. Hunt** has been appointed advertising manager for the firm. Mr. Quinlan joined the company in 1943, after 17 years as a newspaperman. He served during much of the last year as advertising and publicity manager with Fafnir. Mr. Hunt had been assistant advertising manager for the organization since last March.

—o—

Morton F. Harvey has been named manager of the new factory sales office, located in Dallas, Tex., Formica Insulation Co., Cincinnati. The new office will serve the southwestern area adjacent to Dallas. Mr. Harvey was with the Formica's sales office in Chicago for more than 20 years. **Edward Brown,** recently released from the Army, is rejoining the Chicago sales office.

—o—

Paul W. Polk has been appointed vice president and manager, Threadwell Tap & Die Co., Greenfield, Mass. The plant, equipment and assets of Threadwell were acquired last August by Sheffield Corp., Dayton, but the Threadwell firm will continue to operate as an independent subsidiary. For the last several years, Mr. Polk has been vice president of the Sheffield firm. Although continuing as a director and officer of the parent company, Mr. Polk will devote all of his time to his new responsibilities at Greenfield. He served in the Navy during the war.

—o—

Lloyd L. Lee has joined the Machine Tool Division, Detroit, Frederick Colman & Sons Inc. Mr. Lee had been vice president in charge of sales and engineering, Plan-O-Mill Corp., Hazel Park, Mich.

—o—

Benjamin Schwartz, Benjamin Schwartz Co., New York, has been re-elected president, New York chapter, Institute of Scrap Iron & Steel Inc. Mr. Schwartz was once director general of the institute, and during the war served in Washington as chief of the Scrap Metals Section, Foreign Economic Administration. Other officers re-elected by the institute are: First vice president, **William Frost,** P. W. Bowers & Co.; second vice president, **Charles J. King,** Charles J. King Scrap Iron & Steel Corp.; secretary, **Albert Raphael,** Bronx Iron & Metals Corp.; and treasurer, **George Alper,** Queensboro Structural Steel Co. **Joseph A. Moscowitz** has been elected chairman of the institute's executive committee. He is with Samuel Sons Iron & Steel Co.

—o—

Harry Dallas has been named resident engineering manager in the Seattle area, Ellinwood Industries Inc., Los Angeles.

—o—

Edwin R. Smith has been named president, Seneca Falls Machine Co., Seneca Falls, N. Y., succeeding **Marcus A. Coolidge,** who has resigned after 40 years to become chairman of the board of directors. For many years, Mr. Smith had been executive vice president and treasurer of the company. He will retain the office of treasurer.

—o—

Torsten H. Parke has been placed in charge of the New York sales office, Scullin Steel Co., St. Louis, succeeding the late **Brownrigg L. Norton.** In 1942, Mr. Parke was appointed deputy chief, Forgings and Castings Branch, War Production Board, Washington. After serving in that position for more than 3 years, he spent a year in Germany with the Office of Military Government, U. S. Group, in charge of the Forgings and Castings Section.

—o—

Clement F. Taylor, mechanical goods representative in metropolitan St. Louis, Goodyear Tire & Rubber Co., Akron, has received a service pin for 30 years of continuous service with the company. Mr. Taylor joined the firm's Mechanical Goods Division in Omaha, Nebr., in 1916.

—o—

Harry A. Dennis has been appointed assistant district manager of sales, Chicago office, Lukens Steel Co., Coatesville, Pa., and subsidiaries, By-Products Steel Corp., and Lukenweld Inc. Mr. Dennis had been sales representative in Erie, Pa., and vicinity, for Lukens and its subsidiaries. He joined the Lukens company in 1939, as a helper in the open-hearth department.

—o—

Gorton M. Evans has been appointed purchasing agent, Pioneer Engineering & Mfg. Co., Detroit. He had previously been with Detroit Gear & Machine Division, Detroit, Borg-Warner Corp., Chicago, and Chrysler Corp., Detroit. **Robert L. Crinnian** has been named assistant chief engineer for the Pioneer company. Mr. Crinnian is a founder

Need Answers about Shearing Stainless?

Shear Blades?
What tolerances are recommended on blades for shearing E-S Type 304 Stainless? Can we use the same blades on E-S Type 316?

Fine Perforating?
What is the smallest diameter hole that can be accurately punched in 30-gage E-S Type 302 sheet, and what is the minimum spacing that will not tear between perforations?

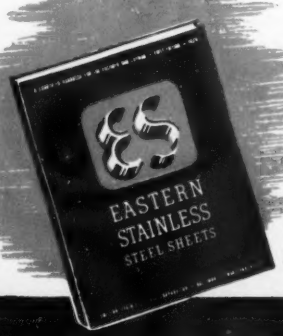
Clearance for Blanking?
What die clearance should we use for blanking 6-in. circles in No. 7-gage E-S Type 410 plate?

Clean Slitting?
In slitting and drawing small louvres in E-S Type 321 Stainless, the metal sometimes strings across the slit. How can we overcome this?

Die Changes?
Will E-S Type 430 break out when stamped? Can we use the same dies in stamping E-S Type 430 that we use in stamping E-S Type 347?

Anneal to Trim?
After spinning E-S Type 304 bowls, we want the edge soft enough for trimming and corrugating, without a second anneal. Is this possible?

ask Eastern for the answer when Stainless is the question



Questions like these are "duck soup" at Eastern. Many of the answers are given in the big new catalog, "Eastern Stainless Steel Sheets," but if you have a specific question about cutting or shearing Stainless, be sure to ask Eastern...where your inquiry is welcome. JMLCo-E-B1

EASTERN STAINLESS STEEL CORPORATION
BALTIMORE 3, MARYLAND • Distributors' stock available in most areas
CHICAGO · CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · PHILADELPHIA

and past president of American Society of Industrial Engineers. At present he is chairman of its board of directors.

—o—

R. E. Griffin has been appointed executive assistant to the general manager, Oldsmobile Division, General Motors Corp., Detroit. He started as a member of the division's service department in Lansing, Mich., in 1916. In 1933, he became distribution manager for Oldsmobile, and in 1940 he was named production manager. In 1941, he was promoted to works manager, and later that year was named manager of Oldsmobile's defense operations. Mr. Griffin was promoted to production manager in February, 1942, and held that position throughout the war period. **T. C. Downey** has been named production manager for Oldsmobile. He is a veteran of 30 years with the General Motors Corp. In 1941, he became manager of Chevrolet's assembly plant in Janesville, Wis. In 1942, Oldsmobile acquired the Chevrolet property for shell production, and Mr. Downey continued as plant manager. He transferred to Lansing in April, 1945, to become assistant to **John Dykstra,** Oldsmobile's manufacturing manager.

—o—

Howard Hansen has been named supervisor of the office of **J. L. Singleton,** manager of district offices of Allis-Chalmers Mfg. Co., Milwaukee. Mr. Hansen joined the company in 1941. Since that time, he has worked in the firm's works accounting department, blower and compressor department and in the administrative office of **William C. Johnson,** vice president of the company's General Machinery Division. **Albert R. Knauss** has been named manager of the Allis-Chalmers office in Memphis, Tenn. Mr. Knauss was assigned to the firm's Tulsa, Okla., office in 1937 as service engineer for electrical equipment in the oil fields. In 1938, he was transferred to sales work in the Tulsa office. He entered the Army in 1941, and rejoined Allis-Chalmers following his release from service.

—o—

Richard M. Humphrey has been appointed service engineer for Iceberg Refrigerated Locker Systems Inc., New York. He will work directly under **J. Barger,** company service manager. Mr. Humphrey had been in charge of refrigeration installation and service continuously since 1928 for various New York concerns.

—o—

Theodore Buit has been appointed a service engineer for the Michigan-Indiana area, Pemco Corp., Baltimore. He will at times do service work for the corporation in other sections. Mr. Buit had spent 25 years with Norge Division, Detroit, Borg-Warner Corp. **Harold N. Reed** has been assigned to the Pemco Pennsylvania-Ohio and Ohio-Indiana area service staff, though he will not be confined entirely to that section. He was with Tyler Fixture Corp., Niles, Mich. Mr. Reed served in the Army during the war.

—o—

Robert S. Sagers has been appointed representative in the Philadelphia area, Middle Atlantic district. Kennametal Inc., Latrobe, Pa. He will work out of the firm's Philadelphia office. **Allen M. Austin** has been appointed an agent in the Kansas City area for the company. That area is part of Kennametal's midwestern district, with headquarters in Chicago. **Harry W. Bearfoot** has been appointed a representative in the Baltimore area for the firm. That area is part of the company's Middle Atlantic district, with headquarters in Philadelphia.

—o—

Ivan C. Alspach has returned to Akron as manager of mechanical goods for Goodyear Tire & Rubber Export Co. Since 1944, he had been the company's mechanical goods representative for the Atlantic seaboard, with headquarters in New York. **William H. Klippert,** a member of the company's mechanical goods sales staff since 1944, has been named to succeed Mr. Alspach in New York. Mr. Alspach joined Goodyear in Akron in 1927, as a tire builder. In 1934, he was appointed sales manager of Goodyear's subsidiary, Wheeling Township Coal Co., Adena, O. He joined Goodyear Export Co. in 1944.

—o—

Eugene N. Foss II has been appointed manager, northwestern district, B. F. Sturtevant Co. Division, Hyde Park, Mass., Westinghouse Electric Corp., Pittsburgh, succeeding Fred Herlan who will retire soon. Mr. Foss will have headquarters in Chicago, and will direct the sale of Sturtevant equipment in northern Illinois and Indiana, western Ohio, parts of Michigan, South Dakota and Montana, and all of Wisconsin, Iowa, Minnesota, Nebraska and North Dakota. He joined Sturtevant in 1934, at Hyde Park. He was transferred to Washington in 1936, as a sales engineer, and later was appointed manager. In 1939, he returned to Hyde Park to become assistant manager of the Cooling & Air Conditioning Division, and a year later was appointed assistant to the president. During the war, he served in the Navy.

LEONARD W. BUGHMAN

Who has been elected president, Edgar E. Brosius Co. Inc., Pittsburgh, noted in STEEL, Nov. 18 issue, p. 76.

—o—

William A. Koegel has been appointed sales manager, MacGregor Golf Inc., Cincinnati. Mr. Koegel, who is a member of the board of directors of MacGregor Golf, which is affiliated with Sports Products Inc., Cincinnati sports equipment firm, served since 1932 as assistant secretary and general credit manager of MacGregor-Goldsmith Inc., its sales subsidiary, located in Cincinnati. **Theodore J. Gillig** will succeed Mr. Koegel as credit manager of MacGregor-Goldsmith. Mr. Gillig, who has been with the firm since 1939, was assistant credit manager. He served in the Army during the war.

—o—

T. H. Skelton, manager, electric melting, Tropenas steel converting and foundry heat treating departments, Edgar Allen & Co. Ltd., Sheffield, England, has retired. Mr. Skelton joined the firm in 1901, as a member of the laboratory. In 1905 he took charge of a new Tropenas converter plant, installed in the firm's tramway department foundry. In 1909, when the Edgar Allen organization installed the first Heroult electric arc furnace to be erected in England, Mr. Skelton took charge of it. In early 1919, he became permanently responsible for the production of steel for the company's steel foundry by both the electric furnace and Tropenas converter processes. He also took charge of the heat treatment of steel castings. **W. H. Everard** will succeed Mr. Skelton, but Mr. Skelton will still be available to the firm as a consultant.

—o—

Dr. W. A. Johnson, manager, metallurgical section, Westinghouse Research Laboratories, Westinghouse Electric Corp., Pittsburgh, has been selected to set up and direct a new Metallurgical Division of the Clinton Laboratories at Oak Ridge, Tenn., in connection with military and peacetime applications of atomic energy. The Clinton Laboratories are operated by Monsanto Chemical Co., St. Louis, for the

JOHN S. HUTCHINS

Who has been elected a vice president, American Brake Shoe Co., New York, noted in STEEL, Nov. 25 issue, p. 60.

CHARLES F. CODRINGTON

Appointed sales manager, blower and compressor department, Allis-Chalmers Mfg. Co., Milwaukee, STEEL, Nov. 18, p. 78.

H. J. LEISENHEIMER

Appointed director of export sales, Hydraulic Press Mfg. Co., Mt. Gilead, O., noted in STEEL, Nov. 25 issue, p. 58.

government, and are devoted exclusively to research and development. Dr. Johnson has been granted a year's leave of absence by Westinghouse, and recently departed to begin organization of the new Metallurgical Division.

—o—

Ernest Szekely, president and general manager, Bayley Blower Co., Milwaukee, has been elected president of the Engineers Society of Milwaukee. **V. Robins Tate,** vice president, Perfex Corp., Milwaukee, was elected vice president of the society.

—o—

D. G. Kimball has been appointed engineer, Wiring Device & Accessory Equipment Division, Bridgeport, Conn., General Electric Co., Schenectady, N. Y. Mr. Kimball joined the company in 1930, in the drafting section of the Wiring Device Division. He has since also served in the Heating Device Engineering Division.

—o—

Robert H. Baugh has been appointed to supervise the sales office opened in Cleveland, Dec. 1, by Monsanto Chemical Co., St. Louis. Mr. Baugh will also represent the firm's Phosphate Division sales in the area. **T. C. Tupper** will represent the company's Organic Chemicals Division, and **R. T. Clark,** the Merrimac Division.

—o—

Charles E. Wilson, president, General Motors Corp., Detroit, will be the principal speaker at the 53rd annual dinner meeting of the Illinois Manufacturers' Association, at the Stevens Hotel in Chicago, Dec. 10. Over 2000 industrialists from Illinois and the Middle West are expected to attend.

—o—

H. W. Breckenridge, president, Breckenridge Machine Co., Cleveland, is retiring as general manager of Joy Mfg. Co., Franklin, Pa., which was sold last June to the Breckenridge Machine organization.

—o—

Norman A. Cobb, former field service engineer for 19 years with A. Leschen & Sons Rope Co., St. Louis, is now that company's Pittsburgh distributor, operating as Cobb Wire Rope & Supply Co. **William J. Heintz** will be associated with Mr. Cobb. Mr. Heintz was with United States Steel Supply Co., Chicago, for 17 years.

OBITUARIES . . .

Charles E. Stephens, who, until his retirement in April, 1945, was a vice president, Westinghouse Electric Corp., Pittsburgh, died in Delray, Fla., Nov. 19. Mr. Stephens joined the company as an apprentice in 1900. He was appointed manager of the firm's supply department in New York in 1917, and later rose to the position of manager of the Central Station Division. He became manager of the eastern district of the company in 1925, and was elected commercial vice president in 1930, in charge of the districts of the Atlantic Division. In 1932 he was elected vice president, in which capacity he served until his retirement.

—o—

A. F. Rice, manager of western region appliance sales, Rheem Mfg. Co., New York, died in the crash of an airliner near Burbank, Calif., recently. Mr. Rice joined Rheem in September, 1945, after service with the Army. Previously he had been sales manager for H. R. Basford Co., San Francisco, and a partner and general manager of Western Stove Co., San Francisco.

—o—

D. W. Blue, 52, superintendent of maintenance, Corsicana, Tex., plant, Bethlehem Supply Co., Tulsa, Okla., died recently in Corsicana. He had been with the plant 36 years.

—o—

Charles Drew Young, 58, general sales manager, Metal & Thermit Corp., New York, died recently in Summit, N. J. Until 3 years ago, Mr. Young was Chicago district manager of the firm.

—o—

John J. Pelley, 68, president of the Association of American Railroads for 12 years, died recently in Washington. He once headed the Central of Georgia Railroad and its associated firm, Ocean Steamship Co., Savannah, Ga. He became president of the New York, New Haven & Hartford Railroad in 1929, resigning in 1934 to accept the association leadership. Mr. Pelley was awarded the Medal of Merit by President Truman for his work as liaison man between the railroads and the government during the war.

—o—

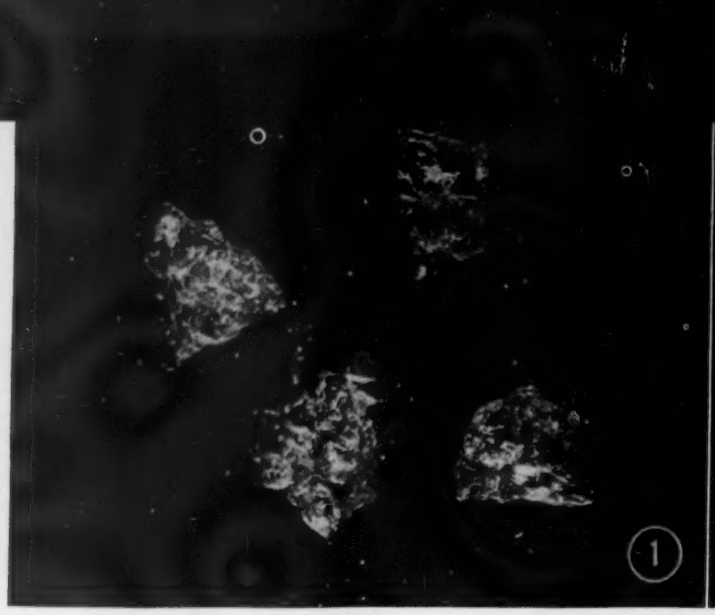
Clarence B. Heiserman, 84, retired vice president and general counsel, Pennsylvania Railroad, Philadelphia, died recently.

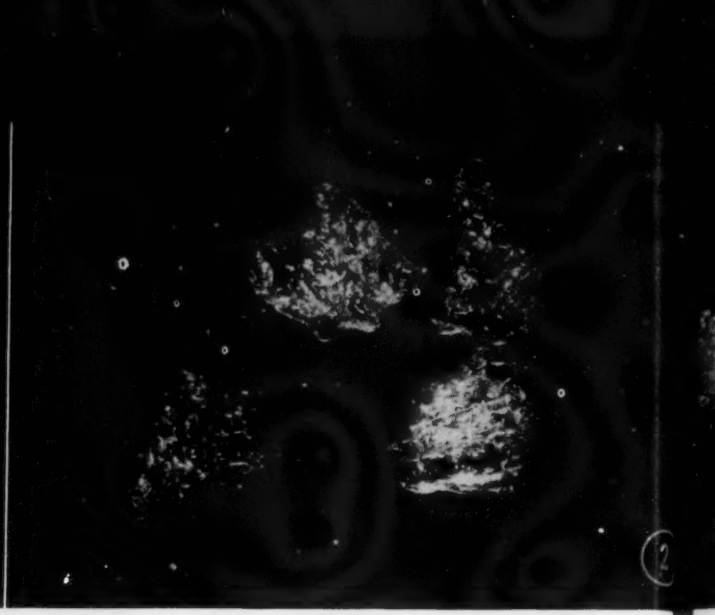
—o—

Arthur J. Eaton, 85, assistant treasurer until his retirement last April, J. I. Case Co., Racine, Wis., died recently in Racine, Wis. He served as assistant secretary of the firm from 1925 to 1938.

—o—

Peerless P. Daume, 73, master mechanic of the Michigan iron mines of M. A. Hanna Co., Cleveland, died recently.





Toward Longer-lived Abrasives

Quest for a 100 per cent usable aluminous abrasive leads to new Norton development whereby final grain is produced for first time in electric furnace, obviating crushing and milling. Highly irregular plane surfaces retained in wheel face after bonding greatly increase cutting efficiency

DEVELOPMENT of an abrasive with superior cutting characteristics for grinding wheels is an attainment of Norton Co., Worcester, Mass. Recent tests of the new 32 Alundum abrasive, an alpha alumina grain 99.6 per cent pure usable abrasive, indicate it will fulfill all expectations.

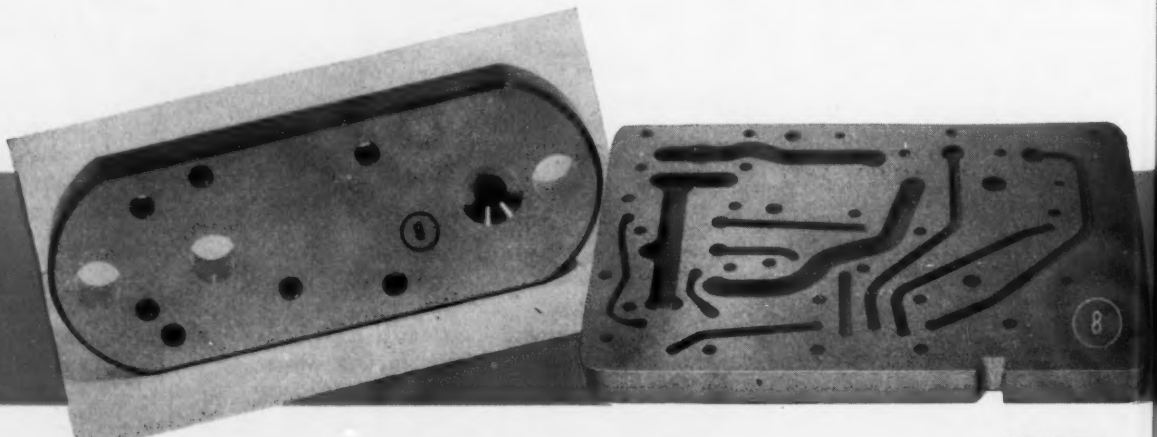
For the first time, the final grain or crystal is produced in the electric furnace without requiring crushing or milling. Crystal growth, in a chemically unstable decomposable matrix, is marked in the finished grain by highly irregular plane surfaces with many sharp points and rake angles. Retained in wheel face surfaces after bonding, these points greatly increase cutting efficiency.

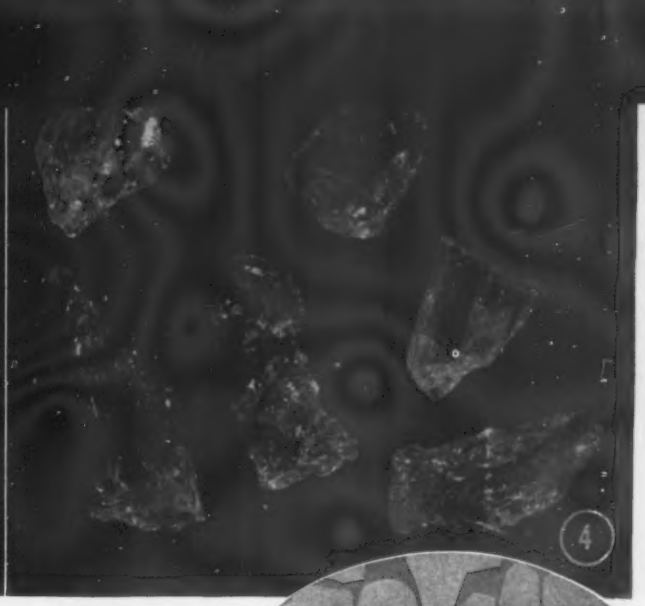
In the process of producing crystals, the matrix hydrates or slacks as burned lime hydrates with water. A grain of high purity, or nearly 100 per cent usable abrasive, is produced in irregular shape with many rake angles or cutting points, undamaged by crushing or milling because these operations have been eliminated.

For most grinding applications, it has been shown that this structure in the new wheels makes possible cooler and faster cutting; the wheels last longer, resist dulling to a marked degree, and require less loading and dressing. Outstanding results are being registered in some classifications, notably in internal, tool-room, hemming, snagging and surface grinding.

Salient and basic improvements in this abrasive, all contributing to improved cutting characteristics, are: (1) Multiple cutting points related to growth of the crystal as an individual entity in the furnace, (2) high purity in alpha alumina making for resistance to dulling of cutting edges and (3) point fracture when serious dulling occurs. The latter property—ability to form a (*Please turn to Page* 142)

By L. E. BROWNE
Associate Editor, STEEL





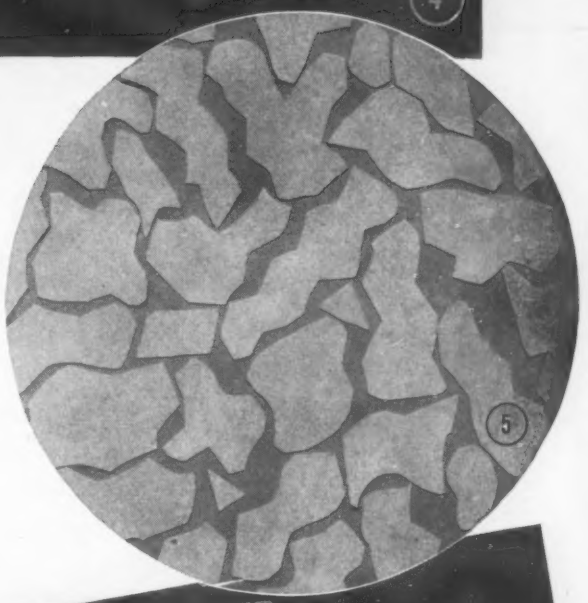


Fig. 1—Internal structure of 32 Alundum No. 24 grain indicating presence of films and stringers distributed throughout each crystal. X20. Compare with Fig. 2

Fig. 2—Internal structure of 38 Alundum No. 24 grain showing micropores in form of bubbles and elongated cylindrical capillaries. X20. Compare with Fig. 1

Fig. 3—Surface of 32 Alundum No. 24 grain at X20 showing many more faces, points and edges than can be seen in Fig. 4

Fig. 4—Surface of 38 Alundum No. 24 grain at X20. Note smooth faces and continuous edges contrasting with nubbliness in Fig. 3

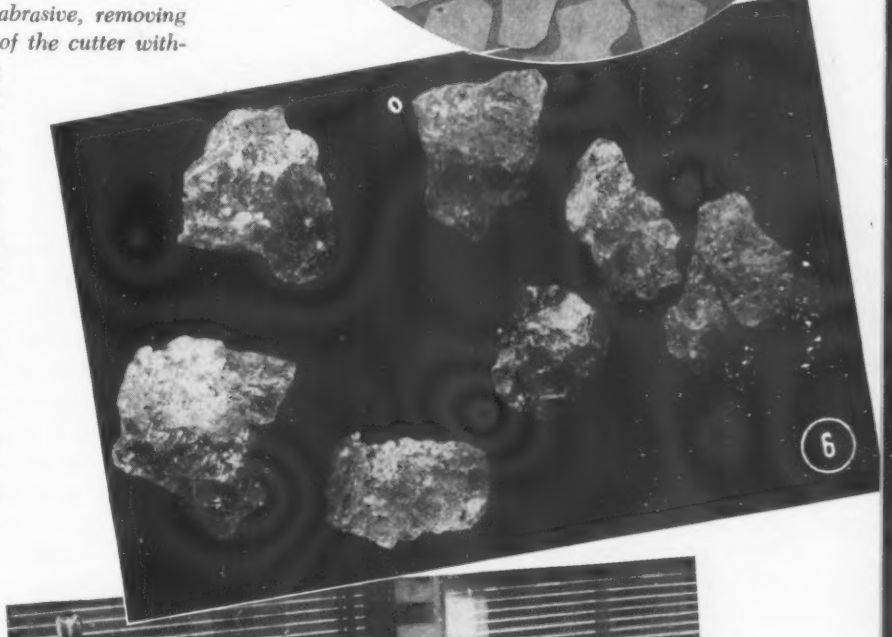
Fig. 5—Schematic of grains of the new 32 abrasive showing matrix. X30

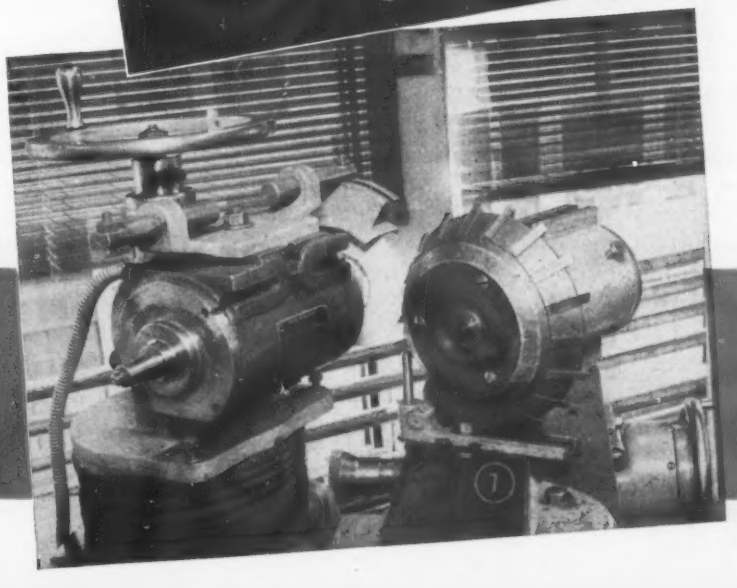
Fig. 6—Typical 16-grit dense abrasive grain made by sulphide process. Note unique grain shape and serrated crystal edges

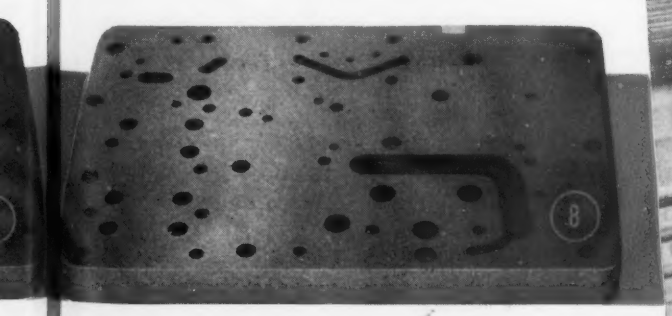
Fig. 7—This high-speed 10-in. steel cutter with 18 inserted teeth each 3/8 x 1 5/8-in. was ground with the new sharper abrasive, removing 0.002-in. from the teeth with each of six revolutions of the cutter without showing any burn or wheel loading

Fig. 8—These cast iron core plates (35 per cent steel scrap) are fitted together on metal-to-metal contact to become part of hydraulic system for an internal grinder and must be absolutely flat to prevent oil leakage. Previously, the many grooves and holes caused very rapid dulling of grinding wheel. With a wheel of the new abrasive, 0.020 to 0.030-in. stock was easily removed between dressings, against 0.010-in. formerly, with feed of 0.002-in. Grinding time for both sides of plate dropped from 35-40 min to 20 min, with better finish

Fig. 9—High-carbon high-chromium steel part (SAE 51335, rockwell C56) for rayon pump in which three holes shown are internally ground to remove 0.012-in. from each. Formerly, best wheel life was 10 holes per wheel. New abrasive raised average to over 40







By G. V. SLOTTMAN
Manager, Technical Sales Division
Air Reduction Co.
New York
and

F. G. KERRY
Manager, Development & Engineering Dept.
Canadian Liquid Air Co.
Montreal, Canada

USE OF Oxygen in the Open Hearth

Steel industry is studying possibilities of increasing production by firing oxygen with the regular fuel during meltdown period. Large scale applications of this new process are being made to prove its economic value. Accompanying article is a progress report on current investigations coupled with a discussion of some theoretical considerations involved

POSSIBILITY of increasing the speed and efficiency of metallurgical processes, as well as of reducing the size of the equipment required, by the enrichment of atmospheric air with oxygen, has been a subject of discussion among steelmakers for many years. The depressing effect of the large volume of atmospheric nitrogen on the flame temperatures produced by the combustion of liquid and solid fuels with air-oxygen has long been recognized as the reason for the low thermal efficiency of metallurgical processes, with the resulting huge capital expenditure for stoves, regenerators and other devices for raising the temperature levels which dwarf the metallurgical furnaces themselves. As early as 1924, in a Bureau of Mines symposium, an active discussion of the use of oxygen-enriched air combustions in the processes of the steel industry was held and the ground work laid for future thinking on the subject. Problems of application seemed relatively simple compared with the problem presented to the technicians of the oxygen industry—the production of oxygen in tons instead of in cubic feet, and at a fraction of the cost.

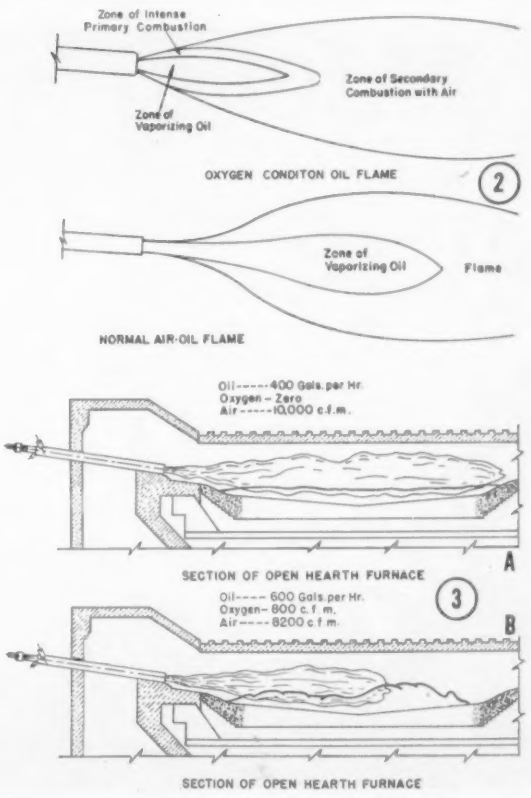
Much of the fundamental research work involved in the development of methods of producing tonnage oxygen with a purity of 45 to 98 per cent has long been completed, and moderate quantities of low-cost oxygen have been available. It now is possible to transfer the emphasis from mere speculation concerning the use of oxygen in combustion processes to active experimental applications designed to prove their economics.

Historical: To date the bulk of such experimental work has been done in Germany, France, Russia and Japan, and has included applications in the blast furnace, the basic bessemer and the copper bessemer, in the production of high Btu gas, and in various chemical processes. Particularly in prewar Germany, an urgency was placed on such work, by the necessity of working with the low-grade ores and cokes which were the only materials available internally with the curtailment of foreign imports, and much of the emphasis was directed toward increasing production rather than toward improving the economics of the processes involved. In applications of interest to the steel industry, the German investigators confined themselves largely to the blast furnace and to the basic bessemer, since these constitute the backbone of German tonnage production. The possibilities of employing tonnage oxygen in open-hearth combustions were largely overlooked and, with the exception of some experiments with oxygen enriched air by Bulle[1] in 1940, using a small gas fired laboratory furnace, no work was done.

As late as 1944 opinion was expressed by Russian engineers[2], (who have given much thought to the use of oxygen in metallurgical operations), that "the use of oxygen in the open-hearth process will be advantageous

[1]References presented at end of article.

Fig. 1—Oil-air flame emerging from port burner
Fig. 2—Principle of oxygen-oil flame
Fig. 3—Comparison of air-oil and oxygen conditioned oil flames at various flows



only under the condition of combining steel melting with the production of steam." Emphasis is laid largely on the possibility of using heating fuels of low calorific value, and of operating the open-hearth furnace without regenerators, utilizing the waste gases for steam generation. Experiments were made with oxygen enriched air in a small 5-ton furnace and increases in the rate of melting scrap were noted. However, it was felt that the field of application for oxygen in existing furnaces was limited by the type of refractory available, and that significant advances could only be made in furnaces designed for using oxygen of relatively high purity, when the regenerative system could be dispensed with. It is interesting to note that what little thought has been given to the use of oxygen in open-hearth furnaces in the past has concerned itself exclusively with the use of oxygen enriched air.

Conditions: At first glance the application of oxygen in existing open-hearth furnace does not appear to offer the same theoretical advantages as would appear to be found in its use in the blast furnace and the bessemer. The open-hearth furnace with its elaborate system of regenerators and waste-heat boilers, has a fairly high thermal efficiency, considering the radiation and cooling water losses, necessary to the maintenance of the refractories. Moreover it operates with a flame temperature exceeding the fusion temperature of the refractories, and further in-

creases in this temperature would appear to result in a prohibitive shortening of the furnace life.

A closer inspection of practical open-hearth operation, however, reveals that, while for a period of one-eighth to one-fourth of the heat, the furnace is operating at refractory temperatures approaching 3000° F, there is a considerable portion of the heat (the charge and meltdown period) when the furnace is at temperatures of 2400 to 2800° F, and contains large quantities of cold materials with high heat absorbing capacity. Moreover, during the charge and meltdown period, when the requirement for heat input (to preheat and melt the charge) are greatest, the conditions for an accelerated combustion rate are poorest. The regenerator checker work has been cooled because of the inrush of cold air during the fettling period and the volume and the temperature of the combustion air is therefore restricted. At the start of charging, the furnace interior is relatively cold, affecting the rate of combustion by lowering the heat radiation to the burning fuel. In addition, the charging of scrap in front of the burners, frequently interferes with the proper development of the flame. As a result of these factors, the rate at which fuel can be burned in the furnace during the charge and meltdown period, is considerably below the heat absorbing capacity of the charge and of the furnace refractories.

Heat Transfer: Further consideration of the course of an open-hearth heat, indicates that the conditions affecting the rate of heat transfer from the flame to the charge vary widely. During the charge and meltdown period, large areas of surface are exposed by the charge, and the heat transfer from the flame to the charge is mainly by direct contact of the flame with the charge in the form of convection and conduction. From theoretical considerations, a high velocity, high temperature flame will be more effective in transferring heat to the cold charge as compared with the soft luminous flame of the normal air-fuel combustion. In addition, since it is impossible to evenly spread the charge over the furnace hearth, with the result that the charge melts unevenly, it is desirable to have a control over the flame length and the point of maximum heat release in the flame, so that accumulations of scrap in the various parts of the hearth can be rapidly melted. A flame which can develop a high rate of heat release per unit of furnace volume, at a high velocity and with a controllable point of maximum flame intensity would possess obvious advantages in the practical working of an open-hearth furnace.

Desirable Flame Characteristics: While some authorities have felt a blow torch type flame was undesirable, many open-hearth operators have long been conscious of the need for a "sharp working flame" during the charge and meltdown period as a prerequisite for a fast working furnace. Burner port types, designed to give a blasting flame, have been developed for mixed gas firing and have operated with satisfactory results, although often at the expense of high cooling water losses and low refractory life. The general adaption of oil firing has intensified the problem of obtaining greater control of the flame characteristics. In oil firing, a thin stream of atomized liquid particles generally carried by steam, emerges from a ¾ to 1-in. nozzle in to an atmosphere of preheated air moving at slow velocity through a space some 50 to 100 sq ft in cross-sectional area. Combustion of the oil can only take place as the oil particles vaporize and diffuse into this air stream. Particularly where the furnace is relatively cool, and where the oil stream is obstructed by the charge, the flame develops slowly and has little direction, the resulting voluminous low velocity flame being particularly ineffective during the charge and meltdown periods, when the furnace heat requirements are greatest.

Oxygen Conditioned Flame: Attempts have been made to improve the form of the (*Please turn to Page* 149)

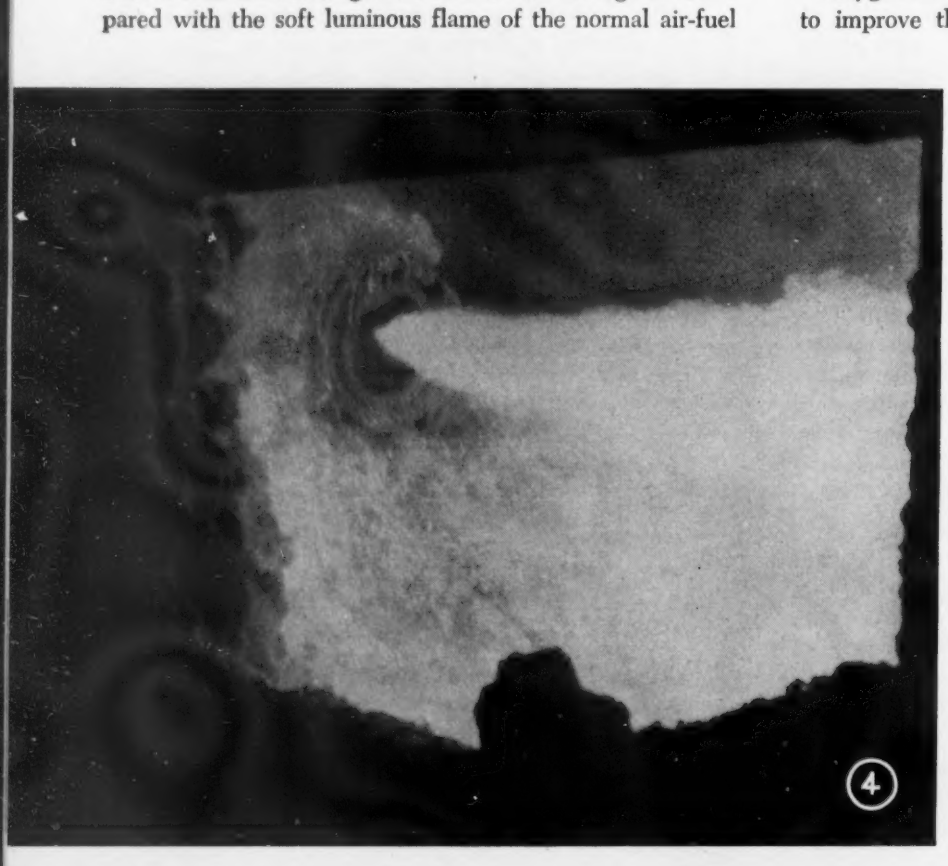


Fig. 4 — Appearance of oxygen-oil flame

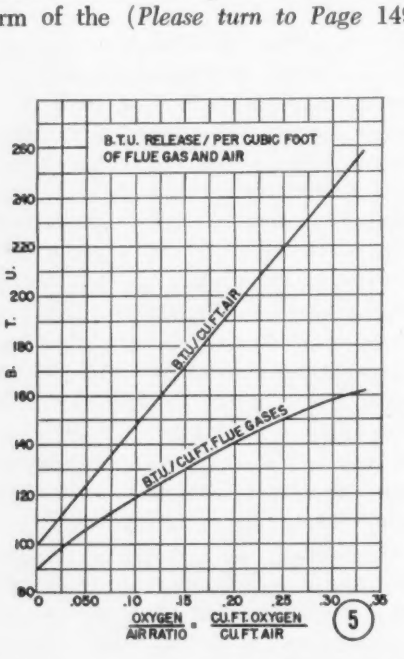


Fig. 5—Effect of oxygen-air ratio on heat release, per unit of waste gas or combustion air

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

HOW TO COVER A SHOW: With national industrial exhibitions constantly growing larger and more complex, many people have asked me this question: "How do you go about seeing one of these big shows?"

I have just returned from the National Metal Show at Atlantic City. In many respects this topped in complexity —if not in size—anything of its kind that I have had the privilege to attend in more than 30 years of convention attending. How did I "cover it"?

You may be surprised when I confess that my method was practically the same as that followed by the traditional cat in the strange garret. In other words, as a machine tool man who began my career in a small country town, my first reaction upon finding myself in the huge convention hall was one of amazement—near panic might be a better way of putting it. Like the strange cat just mentioned, my first instinctive action was to run all over the place. As a matter of fact, that is exactly what I did.

After a full afternoon hurrying up and down endless aisles, I had made a fairly complete tour of the institution, without having studied any particular individual exhibit. However, just as I presume happens in the mind of the cat, the overall pattern of the thing had begun to be to some degree understandable. I had become oriented, knew where the entrances and exits were, and found myself becoming curious about some of the details.

Thereupon—after soaking my feet in sea water and changing my shoes—I began another circuit which could be described as a "prowl". The pace was slower, I knew the road ahead, I began to venture into booths. I began to gather information. Also, I began to form some opinions as to the overall significance of the exhibition as a mirror of recent technological progress.

Up to that point it is probable that my reactions to the big show would just about parallel those of any person interested in any branch of technology therein represented. From that point on, however, the chances are that my conclusions primarily were those of a machine shop man. Those of a metallurgist undoubtedly would be quite different. Those of an industrial chemist again would be different. So also would be those of a physicist. Our various conclusions undoubtedly would be just about as different as were those of the several blind men who grasped various parts of an elephant, and then described an elephant on the basis of the "feel" of that particular portion of his anatomy which they happened to get hold of.

When it came to writing up the big show for the benefit of the readers of STEEL who were not fortunate enough to attend, I think that we managed to "re-assemble the elephant" in form fairly true-to-life. At least four of us contributed to this re-assembly job, including Irwin Such, Brad Wilkin, John Knox and myself. Each one of us had gotten a grip on something. None of these details were alike. However, we put them together—and they fitted neatly. Thus was assembled the overall report on the Show which appeared in the November 25, 1946 issue of STEEL.

HOW INDUSTRY STARTED: Several weeks ago, I mentioned the fact that here in the United States we have a number of successful industrialists who also are competent historians of industry. As historians they are unique in that while writing history they are at the same time "making history" through their day-to-day activities in development, manufacture and marketing of machines, tools and products produced thereby.

One such is Leighton Wilkie of Des Plaines, Ill., whose achievements in the field of metalcutting machinery—contour sawing machines in particular—are well known to readers of this page. After hours, Mr. Wilkie makes something more than a hobby of the study and interpretation of the history of science and industry. I say "more than a hobby," because the end results which he attains through his after hours activities are of vital importance to the good cause of keeping people "thinking straight" about the role of industry in American life at a time when determined efforts are being made to warp their thinking.

Back in 1939, Leighton Wilkie developed a remarkable graphical chart, 5 ft by 2 ft in size, which depicted the origin and growth of industries in the United States. In a manner that "he who runs may read," this demonstrated that employment is machine-made in our economy, that wages are machine-made, and that the machine is the only stepladder to a higher standard of living.

I now have before me another Leighton Wilkie chart showing "The History of the Machine Age." This 19 in. by 25 in. scroll shows two massive columns rising out of prehistoric darkness. The stones in the left hand column, reading from foundation up, are labeled respectively: Use of Tools; Mass; Astronomy; Laws of Physics; Metallurgy; and Steam Power. Those in the right hand column are labeled: Use of Fire; Light-Time; Sound; Magnesium; Electricity; Cotton Gin.

Two cap stones and a keystone complete an arch at the top of these columns. The left hand cap stone is labeled Interchangeable Parts and the right is Quantity Production. The keystone is labeled Machine Tools. On that arch, completed about the year 1800 AD, industries as we know them today, have been built up.

As Mr. Wilkie says: "Since 1800 the Industrial Revolution has created abundant food, clothing, services and articles of every description, thus allowing the world's population to more than double in the intervening period. This symbolic picture indicates when essential discoveries and inventions were contributed. On this structure of knowledge our fabulous era of expanding productivity has been built. Costs go down, wages and security go up for everyone, when improved equipment is used efficiently."

You and I may be quite aware of these truths. The important point right now is: "Are we, like Leighton Wilkie, doing our share to convince a lot of other people of these truths?"

Prepared Atmospheres

A codification of all prepared furnace atmospheres is presented as an aid in selecting suitable atmospheres for the greatly varied processing of metals

By C. C. EELES, and M. E. SHRINER
Ohio Fuel Gas Co.
Toledo, Ohio*

EVER broadening application of prepared atmospheres makes it necessary for all industrial and commercial gas engineers to have a thorough working knowledge of the subject. It is the intent of this article to correlate the principal facts concerning those prepared atmospheres now available to industry.

Reactions of the primary gases with iron and steel are discussed in a later section. The greatest application of prepared atmospheres at present is in connection with the processing of these metals. A working knowledge of these reactions is, therefore, of primary importance to a good understanding of the subject.

Table I is prepared to give a clear and concise picture of the many types of prepared atmospheres now in use. They have been arranged in four groups based on their method of preparation: First, "exothermic base" prepared by combustion of an air/gas mixture; second, "prepared nitrogen base" produced by removal of all water vapor and carbon dioxide from an exothermic base gas; third, "endothermic base" resulting from the cracking of an air/gas mixture in a catalyst-filled externally-heated retort; fourth, "charcoal base" which depends upon the passing of air through incandescent charcoal; and fifth, "ammonia base" made primarily from dry anhydrous ammonia gas. These groups have been given the characteristic series number 100, 200, 300, 400 and 500 respectively.

There are several different gases falling under each of the above general groupings. Additional numerical designations have been applied to show variations in their method of preparation.

01 indicates the use of a lean air/gas mixture
02 indicates the use of a rich air/gas mixture

Thus throughout the numbering system and "odd" number in the last digit denotes the use of a lean mixture and an "even" number, a rich mixture.

The balance of the numbering system is as follows:

03 and 04 indicate preparation of the gas was completed within the furnace itself without use of a separate machine or generator.

05 and 06 indicate the original base gas was subsequently passed through incandescent charcoal before admission to the work chamber.

07 and 08 indicate the addition of a raw hydrocarbon fuel gas to the base gas before admission to the work chamber.

09 and 10 indicate the additions of both a raw hydrocarbon fuel gas and raw dry anhydrous ammonia to the base gas before admission to the work chamber.

11 and 12 indicate the addition of a combusted mixture of chlorine, hydrocarbon fuel gas and air to the base gas before admission to the work chamber.

13 and 14 indicate that the base gas has had all sulphur or all sulphur and odors removed before admission to the work chamber.

15, 16, 17 and 18 indicate the addition of lithium vapor to the base gas before admission to the work chamber.

21 and 22 indicate some additional special treatment has been given the base gas before admission to the work chamber.

Also, Table I specifies the usual air/gas ratio employed for formation of the base gas and its average chemical analysis. The volume of fuel gas required to make one thousand cubic feet of the prepared atmosphere and the nature of the prepared atmosphere are likewise shown. Data relative to the probable dew point and cost of preparation are also indicated.

A large number of important industrial processes requiring the proper application of prepared atmospheres is given in Table II. The right hand column designates by an X those atmospheres which are most commonly used, and by an O those which could be satisfactorily used. This section was prepared by summarizing replies received to a questionnaire sent to all of the known manufacturers of prepared atmosphere machines and equipment.

Table III lists the types of prepared atmosphere apparatus built by the producers of such equipment. Where

* Data for this report was compiled for the Committee on Heat Treating and Finishing with Gas of the American Gas Association.

TABLE I

Characteristics of Various Prepared Atmospheres

Method of Preparation	Air/Gas Ratio	N_2	CO	CO_2	H_2	CH_4	Dew Point °F	Cu.Ft.Gas Per M.C.F. Atmos. (B)	Dollars Per M.C.F. Atmos. (C)	Nature of Atmosphere
Exothermic Base - Combustion of Gas-Air mixture. This may be followed by water, refrigeration or absorbent tower dehydration depending on desired dew point.										
101 - Exothermic Base with lean mixture	9.0	86.8	1.5	10.5	1.2		(D)	120	0.070	Non-Combustible; Slightly Reducing
102 - Exothermic Base with rich mixture	6.0	71.5	10.5	5.0	12.5	0.5	(D)	155	0.085	Combustible; Toxic; Medium Reducing
103 - Class 101 prepared directly in the furnace										
104 - Class 102 prepared directly in the furnace										
105 - Class 101 followed by passage through incandescent charcoal		77.8	20.1		2.1					Combustible; Toxic; Very Reducing
106 - Class 102 followed by passage through incandescent charcoal		67.3	19.3		12.9	0.5				Combustible; Toxic; Very Reducing
112 - Class 102 plus combusted mixture of chlorine, hydrocarbon fuel gas and air										
113 - Class 101 with sulphur removed										
114 - Class 102 with sulphur removed										
116 - Class 102 carrying lithium vapor (red-line cartridge)										
118 - Class 102 carrying lithium vapor (blue-line cartridge)										
Prepared Nitrogen Base - Exothermic Base followed by removal of carbon dioxide and water vapor										
201 - Prepared Nitrogen Base with lean mixture	9.0	97.1	1.7		1.2		-40	135	0.100	Non-Combustible; Inert
202 - Prepared Nitrogen Base with rich mixture	6.0	75.3	11.0		13.2	0.5	-40	160	0.120	Combustible; Toxic; Medium Reducing
207 - Class 201 plus raw hydrocarbon fuel gas										
208 - Class 202 plus raw hydrocarbon fuel gas										
213 - Class 201 with sulphur and odors removed										
214 - Class 202 with sulphur and odors removed										
Endothermic Base - Gas-Air mixture reacted in catalyst-filled externally heated chamber										
301 - Endothermic Base partially reacted followed by quick cooling to eliminate breakdown of $2CO \rightarrow C+CO_2$	2.6	45.1	19.6	0.4	34.6	0.3	+50	190(E)	0.230	Combustible; Toxic; Very Reducing
302 - Endothermic Base completely reacted and cooled as in Class 301	2.5	39.8	20.7		38.7	0.8	0 to -5	200(E)	0.230	Combustible; Toxic; Very Reducing
305 - Class 301 followed by passage through incandescent charcoal										
307 - Class 301 plus raw hydrocarbon fuel gas										
308 - Class 302 plus raw hydrocarbon fuel gas										
309 - Class 301 plus raw hydrocarbon fuel gas and raw ammonia										
310 - Class 302 plus raw hydrocarbon fuel gas and raw ammonia										
315 - Class 301 carrying lithium vapor (white-line cartridge)										
Charcoal Base - Air passed through charcoal-filled vertical retort externally heated and with prepared gas drawn off at maximum temperature zone. Undesirable constituents of green charcoal eliminated by venting small portion of the gas formed at top.										
402 - Charcoal Base		64.1	34.7		1.2		-20	12.5 lbs charcoal	0.430	Combustible; Toxic; Extremely Reducing
408 - Class 402 plus raw hydrocarbon fuel gas										
410 - Class 402 plus raw hydrocarbon fuel gas and raw ammonia										
421 - Air plus ammonia and benzol passed through incandescent charcoal without external heating		63.0	33.5	1.0	2.0	0.5	-10	16.0 lbs charcoal	0.430	Combustible; Toxic; Extremely Reducing
Ammonia Base -										
500 - Ammonia - Raw										
501 - Ammonia dissociated in externally-heated chamber	No Air	25.0			75.0		-60	23.5 lbs ammonia	2.00	Combustible; Reducing
521 - Class 501 nearly completely burned followed by water, refrigeration or absorbent tower dehydration depending on desired dew point	1.9	89.0			1.0		(D)	13.7 lbs ammonia	1.20	Non-Combustible; Inert
522 - Class 501 partially burned followed by water, refrigeration or absorbent tower dehydration depending on desired dew point	1.3	80.0			20.0		(D)	14.9 lbs ammonia	1.30	Combustible; Slightly Reducing

Notes - (A) Analyses based on 1000 Btu. natural gas with 9.6 air/gas ratio. For other gases multiply air/gas ratio by: 0.5 for high H_2 artificial gas; 0.4 for medium H_2, high CO artificial gas; 2.5 for propane; 3.2 for butane. With artificial gas CO is slightly lower and H_2 somewhat higher. With propane and butane the reverse is true.

(B) Cu. Ft. per M.C.F. of atmosphere based upon 1000 Btu. natural gas. For other gases multiply by: 2.0 for high H_2 artificial gas; 2.5 for medium H_2, high CO artificial gas; 0.4 for propane and 0.3 for butane.

(C) Costs based on natural gas at $0.40 per M.C.F., Electricity at $0.01 per KWH, and water at $0.06 per M gal. Amortization is not included. Cost used for charcoal $0.025 per lb and ammonia $0.07 per lb.

(D) Dew point corresponds to room temperature using tap water cooling. May be reduced to +40° F by refrigeration or - 50° F by absorbent towers.

(E) Plus 250 Cu. Ft. per M.C.F. for heating gas.

they apply a characteristic or trade name to these units, it is shown together with the sizes of the standard machines available.

It is hoped that this article will serve as a reliable source of data on prepared atmospheres which will prove of value to industrial and commercial gas engineers.

PRIMARY GASES AND THEIR REACTIONS

Oxygen reacts with ferrite of steel producing iron oxide, with carbon of steel to lower carbon content of its surface.

Nitrogen—in its molecular state— is entirely passive to ferrite and entirely satisfactory for bright annealing low carbon steels. If completely pure and dry it is passive to high carbon steel. The presence of even traces of moisture will however, cause decarburization. In the nascent state at the instant ammonia is "cracked" in a furnace it very actively combines with alloying elements in certain steels to form finely divided nitrides which impart extreme hardness to the surface.

Carbon Dioxide is reactive with ferrite and causes oxidation ($Fe + CO_2 \rightarrow FeO + CO$). It also decarburizes ($Fe_3O + CO_2 \rightarrow 3Fe + 2CO$). Since in either case carbon monoxide is a reaction product, the effects of carbon dioxide on the steel surface may be offset or counter balanced by mixing it with certain portions of carbon monoxide gas. For low carbon steels the CO/CO_2 ratio may be in the order of two to one. High carbon steels, depending upon the temperature of treatment, require ratios as high as one hundred to one.

Carbon Monoxide reacts with ferrite at higher temper-

TABLE II

Prepared Atmospheres Suitable for Heat Treatment of Different Materials

Material	Process	Temperature Range °F.	Cycle (Long if over 2 hr.)	Required Surface	Class No. of Suitable Atmospheres (× most commonly used. ○ can be used.) 101 102 103 104 105 106 112 113 114 118 201 202 207 208 213 214 301 302 305 307 308 309 310 315 402 408 410 421 500 501 521 522
Annealing and Normalizing					
Steels to 0.20C	Anneal	1200–1350	Long	Bright	× ○ ○ ○

atures to form iron carbide ($3Fe + 2CO \rightarrow Fe_3C + CO_2$). It is desirable for heat treating high carbon steels. At low temperatures it tends to break down forming carbon dioxide and free carbon which deposits on the steel. ($2CO \rightarrow CO_2 + C$).

Hydrogen is highly reducing to iron oxide and hence a powerful deoxidizer. Steel absorbs it at certain temperatures either by occlusion or by combination with ferrite to form iron hydride. Embrittlement can result, especially in high carbon steels. Dry (*Please turn to Page* 154)

TABLE III

Manufacturers of Prepared Atmosphere Equipment

American Gas Furnace Co.

501 -	Gas Dissociator	100, 200

Associated Industrial Engineers, Inc.

101 -	Lean Exogen	50, 100, 250, 500, 1M, 2M cfh
102 -	Rich Exogen	50, 100, 250, 500, 1M, 2M cfh
201 -	Lean Monogen	50, 250, 500, 1M, 2M cfh
202 -	Rich Monogen	50, 250, 500, 1M, 2M cfh
301 -	Lean Endogen	50, 100, 250, 500, 1M cfh
302 -	Rich Endogen	50, 100, 250, 500, 1M cfh
307 -	Lean Endogen plus	50, 100, 250, 500, 1M cfh
309 -	Lean Endogen plus	50, 100, 250, 500, 1M cfh
501 -	Ammogen	50, 100, 250, 500, 1M, 2M cfh
521 -	Completely Combusted Ammogen	50, 100, 250, 500, 1M, 2M cfh
522 -	Partially Combusted Ammogen	50, 100, 250, 500, 1M, 2M cfh

Bellevue Industrial Furnace Co.

301 -	
302 -	
307 -	
308 -	

Continental Industrial Engineers, Inc.

Various types

Delaware Tool Steel Corporation

103 -	
104 -	

Electric Furnace Co.

101 -	Combustion type for nonferrous metals
102 -	Standard combustion type
301 -	Endothermic type
302 -	Endothermic type
307 -	Endothermic type (special)
308 -	Endothermic type (special)

General Electric Co.

101 -	Atmosphere gas converter
102 -	Atmosphere gas converter
105 -	Drycolene
106 -	Drycolene

Hevi-Duty Electric Co.

301 -	Cracked
302 -	Cracked
305 -	Cracked plus charcoal

Holcroft and Company

101 -	
102 -	
113 -	
114 -	
301 -	
302 -	
307 -	
308 -	
309 -	
310 -	
402 -	

The C. M. Kemp Mfg. Co.

101 -	Inert Gas (lean)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
102 -	Inert Gas (rich)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
103 -		
104 -		
201 -	Inert Gas (special)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
202 -	Inert Gas (special)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
207 -	Inert Gas (special)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
208 -	Inert Gas (special)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
213 -	Inert Gas (special)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
214 -	Inert Gas (special)	1M, 2M, 3M, 4M, 6M, 8M, 15M, 30M, 45M, 120M
301 -	Atmos Gas (lean)	1M, 2M, 4M, 6M, 8M, 10M, 25M
302 -	Atmos Gas (rich)	1M, 2M, 4M, 6M, 8M, 15M, 25M
307 -	Atmos Gas (special)	1M, 2M, 4M, 6M, 8M, 15M, 25M
308 -	Atmos Gas (special)	1M, 2M, 4M, 6M, 8M, 15M, 25M

Lindberg Engineering Company

101 -	Lean Hyrex
102 -	Rich Hyrex
301 -	Lean Hyrex
302 -	Rich Hyrex
307 -	Lean Hyrex (special)
308 -	Rich Hyrex (special)
309 -	Lean Hyrex (special)
310 -	Rich Hyrex (special)
402 -	Hyco
421 -	Hyco
501 -	Hyrex
521 -	Hyrex (special)
522 -	Hyrex (special)

The Lithium Company

116 -	Lithium Neutral Hardening Atmosphere
118 -	Lithium Neutral Descaling Atmosphere
315 -	Lithium Carburising Atmosphere

Mahr Manufacturing Co.

201 -	Prepared Nitrogen	100 to 3M cfh
202 -	No-Ox	100 to 3M cfh
207 -	Prepared Nitrogen (special)	100 to 3M cfh
208 -	No-Ox (special)	100 to 3M cfh

Salem Engineering Co.

101 -	750, 1M, 1.5M, 2M, 3M, 15M cfh
102 -	750, 1M, 1.5M, 2M, 3M, 15M cfh
103 -	
104 -	
301 -	750, 1M, 1.5M, 2M, 3M cfh
302 -	750, 1M, 1.5M, 2M, 3M cfh
307 -	750, 1M, 1.5M, 2M, 3M cfh
308 -	750, 1M, 1.5M, 2M, 3M cfh
501 -	750, 1M, 1.5M, 2M, 3M cfh

Surface Combustion Corporation

101 -	Lean DX	250, 500, 1M, 2M, 4M, 8M, 10M, 15M, 25M cfh
102 -	Rich DX	250, 500, 1M, 2M, 4M, 8M, 10M, 15M, 25M cfh
103 -	Lean AG	
104 -	Rich AG	
112 -	Gas Pickling Atmosphere	
201 -	Lean NX	1M, 2.5M, 5M, 10M, 20M cfh
202 -	Rich NX	1M, 2.5M, 5M, 10M, 20M cfh
207 -	Lean NX (special)	1M, 2.5M, 5M, 10M, 20M cfh
208 -	Rich NX (special)	1M, 2.5M, 5M, 10M, 20M cfh
301 -	Lean RX	500, 750, 1M, 1.5M, 2.4M, 3.6M cfh
302 -	Rich RX	500, 750, 1M, 1.5M, 2.4M, 3.6M cfh
307 -	Lean RX (special)	500, 750, 1M, 1.5M, 2.4M, 3.6M cfh
308 -	Rich RX (special)	500, 750, 1M, 1.5M, 2.4M, 3.6M cfh
309 -	RX Dry Cyanide - Lean	
310 -	RX Dry Cyanide - Rich	
402 -	Char-Mo 2300	500, 1M cfh
408 -	Char-Mo (special)	500, 1M cfh
410 -	Char-Mo Dry Cyanide	
501 -	AX	500, 1M, 2M cfh
521 -	Lean AX	500, 1M, 2M cfh
522 -	Rich AX	500, 1M, 2M cfh

Westinghouse Electric Corporation

101 -	Lean Exogas	250, 500, 750, 1M, 1.5M, 2M, 3M, 4M, 5M, 6M, 8M, 10M, 15M, 20M cfh
102 -	Rich Exogas	250, 500, 750, 1M, 1.5M, 2M, 3M, 4M, 5M, 6M, 8M, 10M, 15M, 20M cfh
201 -	Lean Monogas	250, 500, 1M, 2M, 3M, 5M, 6M, 8M, 10M, 15M, 20M cfh
202 -	Rich Monogas	250, 500, 1M, 2M, 3M, 5M, 6M, 8M, 10M, 15M, 20M cfh
207 -	Lean Monogas (special)	
208 -	Rich Monogas (special)	
301 -	Lean Endogas	150, 250, 350, 500, 750, 1M, 1.5M, 2M, 3M, 4M cfh
302 -	Rich Endogas	150, 250, 350, 500, 750, 1M, 1.5M, 2M, 3M, 4M cfh
307 -	Lean Endogas (special)	
308 -	Rich Endogas (special)	
501 -	Ammogas	150, 300, 500, 750, 1M, 1.2M, 2M, 3M, 4M cfh
521 -	Lean Combusted Ammogas	250, 500, 750, 1M, 1.5M, 2M, 3M, 4M cfh
522 -	Rich Combusted Ammogas	250, 500, 750, 1M, 1.5M, 2M, 3M, 4M cfh

Lee Wilson Engineering Co.

101 -	250, 500, 750, 1M, 2M, 3M, 4M cfh
102 -	
201 -	
202 -	
207 -	
208 -	

Engineering News *at a Glance*

TO BE IN PRODUCTION: From Los Angeles, Ellinwood Industries Inc. reports its 4-plus air-cooled, single cylinder gasoline engine will be in production this month. Designed originally as the exclusive power unit of the company's tractors, the engine because of a wide demand now is being sold for use in other fields. Important feature of the engine is an integral half-speed drive that permits full horsepower output at one half the normal crankshaft speed.

MORE AIR "HORSES:" Power equivalent to that produced by a modern railway locomotive is generated by what is called the world's most powerful reciprocating aircraft engine. Unveiled recently by the Army Air Forces at the Lycoming Division of Aviation Corp., Williamsport, Pa., the engine, called the XR-7755, develops 5000 horsepower at takeoff. It has 36 cylinders in four banks of nine each. Developed for powering long-range aircraft, the liquid-cooled engine combines high power output necessary for take-off with low fuel consumption necessary for range. Engine coolant is circulated at a rate of 750 gal per min, dissipating enough heat at takeoff to heat a large hotel.

GAS FROM BOTTLES: Bottled gas for the heating medium is used by Maritime Quality Hardware Co., Belfast, Me., in connection with its Sunbeam Stewart furnaces in heat treating dies, tools, jigs or fixtures. Gas is supplied from two batteries of 10 propane cylinders of 100-lb capacity each, one battery being in stalled on each side of an automatic regulator, according to "Metal Minutes."

STAINLESS-CLAD BUMPERS: Auto bumpers and other accessories now can be fabricated from stainless-clad steel. In Washington, Pa., Fred T. H. Youngman, president of Jessop Steel Co., revealed the successful completion of experiments in the application of the metal to auto and truck parts, begun several months ago. He said the cladding will not chip, flake or peel, and maintains a permanently rust-free surface. Also, he added, it can be polished to a high finish, retaining a pleasing appearance during the life of the vehicle. Steel supplied for the experiments was made with 10 to 20 per cent stainless cladding on a mild steel backing. The cladding, of controlled thickness, is united to the mild steel backing during the hot rolling process, and cannot separate even under severe bending operations. Scratches on stainless-clad bumpers can be reground and polished without losing its rust resistance. Deep gouges that penetrate the mild steel backing can be built up by welding, and polished to match original finish.

NO MORE HEDGING: Composite opinion of a group of as many as 120 individuals may be measured and indicated by a new instrument developed recently by General Electric Co., Schenectady, N. Y. Called an opinion meter, the device enables each person in a group to secretly express, in degree, his reactions on any subject. All opinions are summated and registered on a large dial as a single figure in about 10 sec.

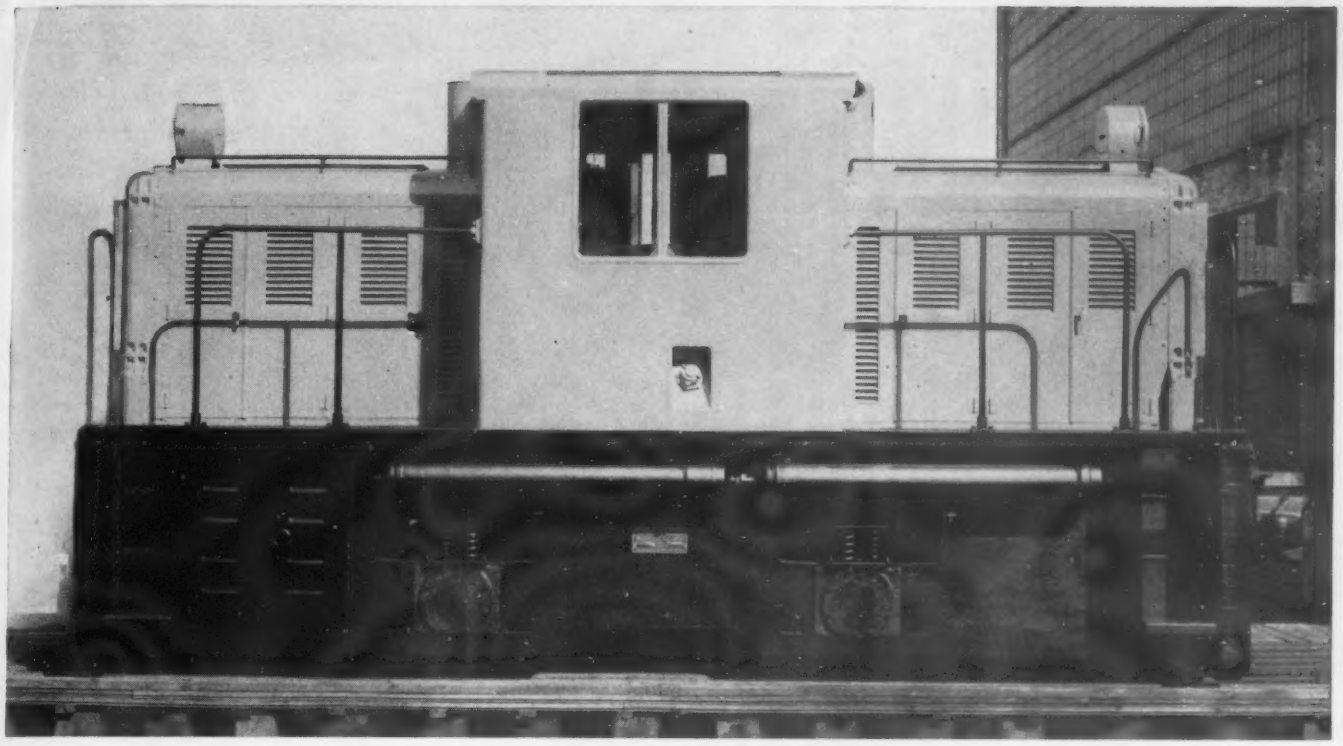
STANDARDIZATION NEEDED: With the trend to large bulk storage plants, there is a greater need for standardization, Eric A. Flaschar, general manager, Stacey - Dresser Engineering Division, Stacey Bros. Gas Construction Co., stated this fall before the National Butane-Propane Association convention in Chicago. At present a 30,000 gal water capacity tank is the largest container permissible for liquid-propane gas storage. Since capacity and working pressure are established, there is no reason why there should be variations in the design of these vessels, he said. It would be advantageous to have all tanks built to standard dimensions by the various makers so they could be interchangeable. For a bulk storage plant requiring an appreciable number of tanks, the production of more than one fabricator must be used to construct the plant economically. Unless tanks are alike, individual foundation design and special piping problems are introduced.

"LAW-ABIDING PISTOL": A "gun" that fires a rivet or stud through more than an inch of steel plate—and small enough to be carried in a hip pocket—recently was ruled officially from the dangerous-weapon classification by the city of Cleveland. The ruling was sought as a precautionary measure by Tempo-tool Co., here, for the war tool invented by Stanley Temple, and used by the Navy for such jobs as patching up holes in the steel skins of battleships. Packing a 20-ton punch, the "gun" now is used on such peacetime jobs as riveting conduit pipe braces or fuse boxes to concrete walls. It is made in three sizes—8 to 20-in. long—each size being fired respectively by .22, .38 and .45-caliber blank cartridges. The .45 model will nail a sheet of steel 1¾-in. thick to a concrete wall. Secret of the tool's firing power is a flange on the stud or rivet projectile which seals the firing chamber after the cartridge is exploded. The charge builds up until the flange is sheared off, and the projectile travels down a 2-in. barrel to the steel target. Once embedded, a threaded stud resists a 25,500-lb pull. Cartridge is fired by forward pressure of a plunger when the end of the barrel is placed against the target.

BROAD-NOSE TOOLS: Cast iron rolls up to 90 scleroscope can be turned with major savings in production costs with a broad-nose tool developed by Kennametal Inc., Latrobe, Pa. According to the company, a roll that required about 25 hours for rough grinding was turned with two 8-in. tools in 8½ hours. Blade of the tool is held securely in position on the surface of the supporting shank by a clamp and serrated, advanceable back-up plate. The blade has four cutting edges. These may be used in succession before doing any resharpening.

INCREASED FLEXIBILITY: Lighter weight, increased flexibility and greater softness are achieved in a new oil and gasoline hose developed recently by United States Rubber Co., New York, for use in unloading oil trucks and tank cars. Carcass consists of two plies of Ustex, a chemically treated textile 70 per cent stronger than conventional cotton yarn. Synthetic rubber lining is used to resist aromatics and high octane fuels. Because of reduced outside diameter, standard size couplings may be used on the hose.

TO PROBE JET COMBUSTION: To push the study of chemical combustion in jet-propelled engines, the Navy Bureau of Ordnance recently appropriated $125,000 to the University of Wisconsin. Objective of the investigation, under the direction of Prof. Joseph O. Hirschfelder, with the chemistry, chemical engineering and mechanical engineering departments participating, is to determine optimum operating conditions, design of burners, choice of fuels etc., for supersonic projectiles. BuOrd asked the school to concentrate on fundamental principles entering into combustion under conditions of supersonic flight. Since the conditions are difficult to reproduce in a lab, it is necessary to proceed theoretically, basing the theory on a large number of simple experiments. This requires bridging the gap between chemical kinetics and practical performance, in addition to combining aerodynamics and other elements.



SIXTH WHITCOMB TO BE PLACED IN SERVICE AT STEEL PLANT WITHIN LAST 90 DAYS

Illustrated is the sixth of a series of 50-ton Whitcomb Diesel Electric Locomotives all identical, to be placed in service at a steel plant within the last 90 days.

Designed especially for application in and around steel mills this 50-ton work-horse is equipped with several special features and characteristics that increase its all-around efficiency in terms of greater performance and ease of operation

Increased visibility for operator is made possible by the new arrangement of windows—more spacious cab is free from drafts as all equipment is enclosed in cabinets—batteries are more accessible for servicing in this new convenient location on the sides—bulk-heads between engines and generators protect the latter from excessive engine heat—safety step-wells provide extra protection for switchmen.

Write for further interesting details regarding this latest locomotive development for steel mills and information explaining how Whitcomb engineers can assist *you* in solving *your* haulage problems.

DIESEL ELECTRICS FROM 25 TO 95 TONS
DIESEL MECHANICALS FROM 3 TO 30 TONS

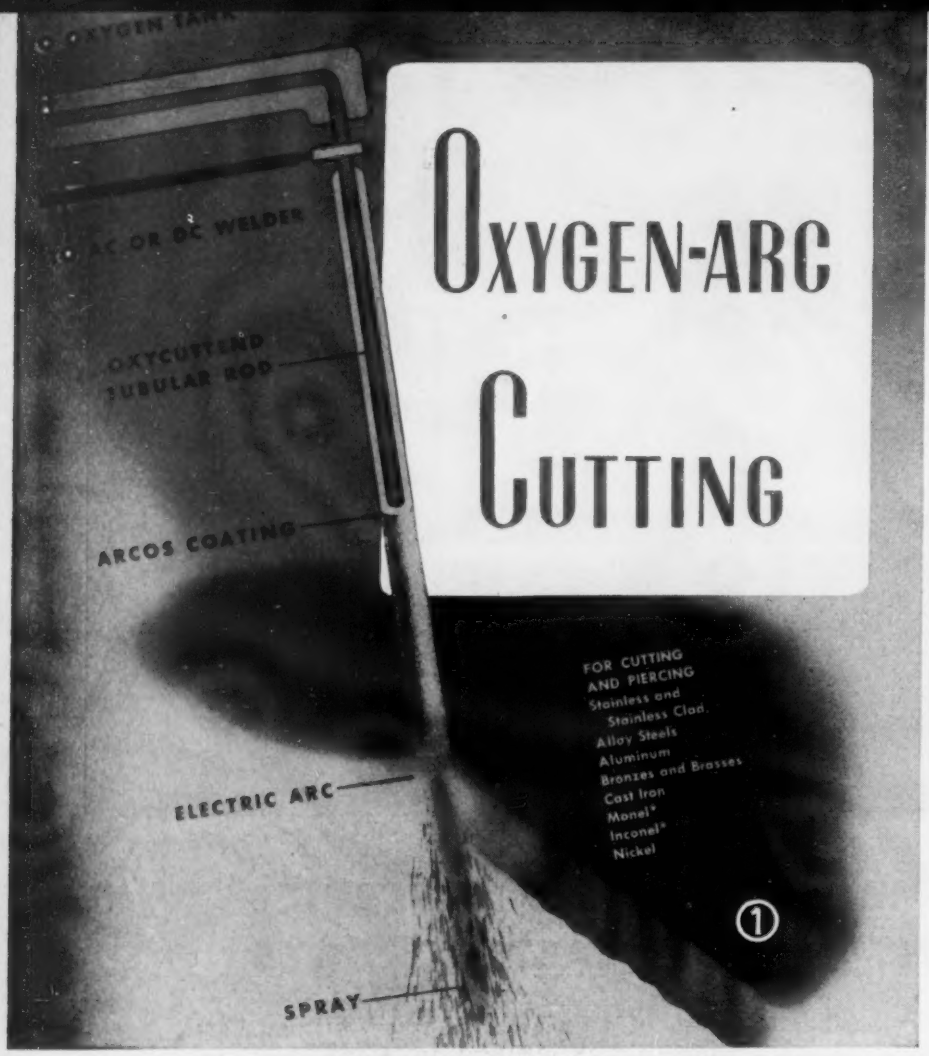
THE WHITCOMB LOCOMOTIVE CO.

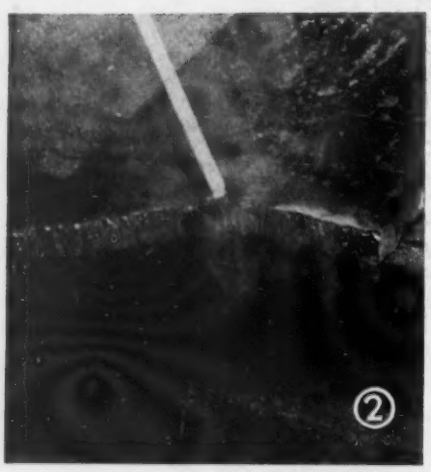
ROCHELLE ILL.

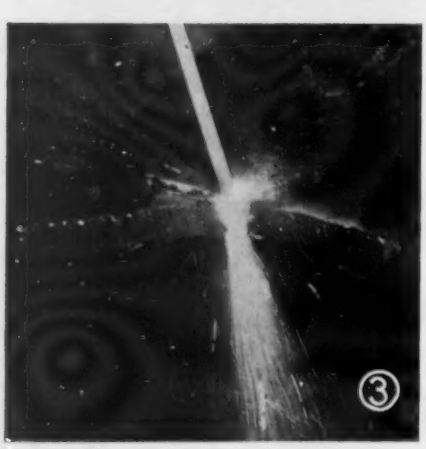
Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

Oxygen-Arc Cutting

In combining a stream of oxygen with the arc by means of a tubular electrode, a cutting temperature is obtained that is 3000 degrees hotter than that usually realized with common cutting methods







CUTTING metals in fabrication operations usually is a difficult and a high cost operation. Development and successful application by the Arcos Corp., Philadelphia, Pa., of its Oxyarc Process for hand cutting stainless steels, alloys, nonferrous metals, cast iron and mild steel, has both simplified and reduced the cost of this job. In this process, metal is cut by means of a highly concentrated "pinpoint" of heat generated by an electric arc and a stream of oxygen. The arc is established between a coated tubular rod and the metal to be cut. The oxygen is supplied through the tube.

The tubular core is made of mild steel. Contamination of the base metal adjacent to the cut does not occur because the extremely high heat and the oxygen under pressure combine to oxidize, at the point of the arc, the rod and coating before it can fuse into the base metal. The coating helps to maintain arc stability by confining and directing the arc, and it acts as an insulator when in use by preventing the striking of an arc at an undesired point in the rod.

Equipment required to cut metal by the Arcos method consists of, first of all, a tubular coated rod called an Oxycuttend rod. This rod is consumed in the process of cutting. In operation, the rod is held by a special holder, in appearance not unlike a welding electrode holder. Through the holder both current and oxygen are fed to the cutting rod. The flow of oxygen is controlled by means of a valve built into the holder and triggered by the operator with the hand which grasps the holder. Holder and rod are shown in Fig. 1. Other equipment required is usually found in any shop where metal fabrication is being done namely, an arc welder either alternating or direct current, and tank oxygen with the usual regulating valves and gages.

This process has been used to cut a variety of metals occuring in the form of sheets, plates and castings, as well as to cut metals in any shape and under various conditions. The 18 in. long Oxycuttend can pierce metal up to thicknesses of 12 in. Some of the tasks to which this metal cutting method has been applied include: Layout problems; cutting risers from castings; the removal of rivets, rusted bolts; gouging of metals, etc.

The economies of the Arcos process result from a number of factors: The initial cost is low—for the shop already welding and using oxygen, the only additional outlay is a small one for the holder; cost of rod replacement (which are consumed in the cutting process) is low; basic skill required for a person to learn to use this tool is easily acquired, therefore training or nonproductive time is cut to a minimum.

Also, the speed with which Oxycuttend cuts and pierces reduces the time required for the cutting operation. This process, develops a temperature approximately 3000° F hotter than the usual cutting process, thus eliminating preheating, This is especially advantageous when making cuts of short length,

Fig. 1—Schematic drawing showing construction of Oxycuttend rod

Fig. 2—The Arcos "Oxyarc" process as arc is struck prior to actual cutting

Fig. 3—Oxygen has been turned on and actual cutting is now under way

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Production stepped up from 700 pieces to 100,000, for one manufacturer. Die servicing cut 95% for another. Die life increased from 20,000 pieces-per-die to 250,000 for another—to name a few.

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wherein the preheat time with oxyacetylene may be a substantial proportion of the actual cutting time. In many cases, when compared with other hand operated burning processes, this method reduces the subsequent preparation of the cut metal edge because cutting can be done very close to the finish line. Under these circumstances, grinding to produce a perfectly smooth edge for a proper fit up is held to a minimum.

Preliminary tests indicate that the Oxyarc process does not contaminate base metal. This is very important in the case of stainless. Available test data indicate that the heat effect on the base metal is substantially less than that encountered in arc welding. Warpage in thin sections is negligible because the heat is applied only momentarily to an area hardly larger than the cross section of the cutting rod. Chipping, grinding, drilling, or machining operations of material cut by this method are less difficult than they would be if performed on material that is cut by burning methods that are usually employed.

In the fabrication of complicated shapes, if holes for flange connections, manholes, or any other shape of connection can be cut in the main vessel after forming, much time, particularly in layout, can be saved. This saving is made possible by the portability and "all-position" qualities of the rod. Another economy, relatively smaller, but definite, is that oxygen is used only when cutting is under way. Both material and time are saved by the fact that cutting may be started and stopped any number of times with the same rod until it is consumed down to the stub.

Fig. 4—Here, 1½-in. thick Everdur is being pierced by means of the oxygen-arc cutting process. Holes up to a depth of 12 in. can be pierced with the 18 in. rod

Fig. 5—Small amount of slag that forms on surface of cut or pierced metal can be chipped loose without difficulty

Army-Navy Bearing Code May Be Adopted

A common numbering system for antifriction bearings was recommended for all manufacturers recently by some 38 representatives of interested industries, government agencies and the Army and Navy.

Standardization similar to the Army-Navy system is expected to be taken up by the Standards council of the American Standards Association, New York, in the near future.

During the war the supply of ball and roller bearings was extremely important and extremely confused because manufacturers used their own numbering systems. According to Secretary of the Navy Forrestal, procurement, interchangeability and substitution were impossible in most cases because of lack of a common numbering system.

Graded Diamond Powders Contained in Compound

Scratch-free finish and surface luster may be attained with Hyprez diamond compound, which contains an abrasive said to be exactly graded to definite standard specifications. Suited for finishing operations on metals, sintered carbides, sapphire and other hard materials, the compound may be used in die and mold work, gage and instrument production in industrial jewel and gem stone manufacture.

Compound is manufactured in a variety of grades, each identified by a distinguishing color and furnished in clear Pyrex cartridges which fit into syringe-type applicators. Product is marketed by Engis Equipment Co., Chicago, and Sapphire Products division of Elgin National Watch Co., Aurora, Ill.

Waterproof Coating for Damp Surface Applications

New type of cold-applied protective coating, Bitumastic, is a black, irreversible dispersion, which when dry, is said not to revert to its original state. Marketed by Wailes Dove-Hermiston Corp., Westfield, N. J., the material contains no volatile solvents, reportedly eliminating discomfort to workmen and danger of fire or explosion in a confined space.

Requiring but a short drying period, the company states that effective applications may be made to dry surfaces, application being either by hand brushing or with standard spray equipment. Because of rapid drying characteristic, two coats may be applied in a continuous operation.

A high degree of plasticity and strong bonding ability are claimed for the material, which is adaptable for use in the protection of metal, concrete, masonry, stone, asbestos-cement products and various types of insulation. It is said not to flow or sag at any temperature up to 600° F, and will withstand corrosive attacks of chemicals, moisture and temperature changes.

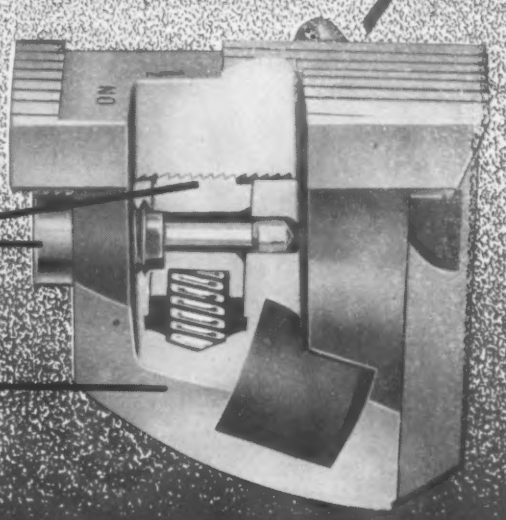
Broaching Methods Discussed in Manual

An illustrated, 172-page manual that covers virtually every phase of methods employed in broaching, broaches and broaching equipment is offered by Colonial Broach Co., Detroit. Book is divided into six parts, first of which is in nature of an introduction, containing such information as history of modern broaching, and illustrated text on manufacture and heat treating of broaches.

Next section discusses broaching fundamentals, design, preparation, how to estimate production and care of broaches. Third section, subdivided into internal and external operations, contains data on all types of broaching. Section four is devoted to broach specifications, enabling reader to properly determine type for a particular job. The final two sections cover types of broaching machines and accessories.

Five Good Reasons Why...

JONES & LAMSON Ground Thread TANGENT CHASER DIE HEADS



PRODUCE BETTER THREADS at LOWER COST!

THREAD QUALITY

1. The Die Heads are hardened and ground throughout. The body is not only ground, it is lapped on the face and in the dovetail slots. The bearing surfaces of the chaser holders are also ground and lapped into the body.

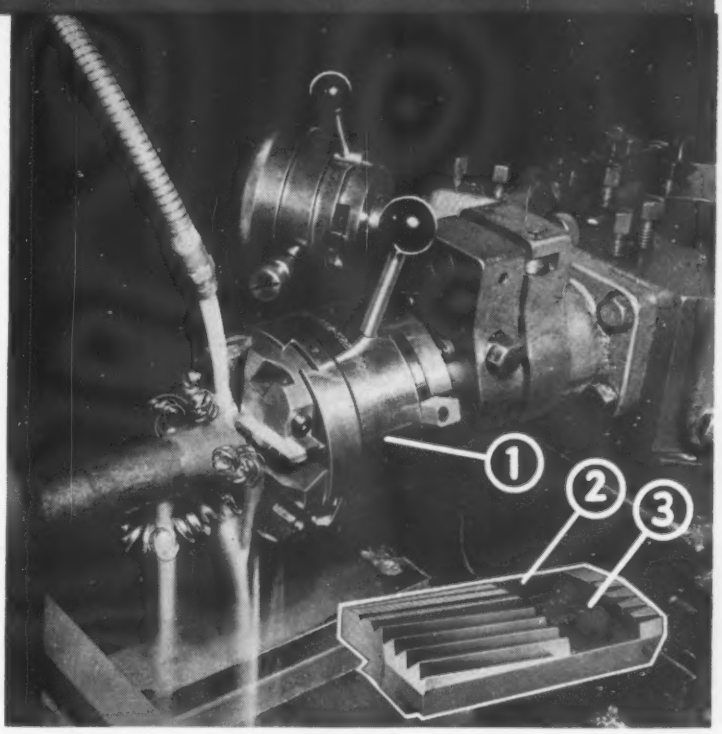
2. Jones & Lamson Ground Thread Tangent Chasers are guaranteed to hold lead correct to .001" per inch and to produce threads to Class III specifications.

3. *The exact helix angle, in fact all the elements of an accurate thread are ground into the chasers after hardening.* The possibility of poor quality threads and costly scrap, due to faulty chaser setting, is eliminated.

ECONOMY

4. *Jones & Lamson Tangent Chaser Die Heads are universal. Only one set of chaser holders is required for all right-hand threads, and only one set of holders is required for all left-hand threads within the rated capacity of the die head, regardless of pitch or diameter.* Investment in chaser holders is reduced to a minimum. Change over and set up is speeded.

5. Chasers are easily and quickly set. Ratchet-teeth on the back of the chasers, corresponding to ratchet-teeth in the holders, provide definite locating points for resharpening, measuring and setting. The chasers are positively and quickly secured. A couple of turns of a single screw releases or secures them in the holders.



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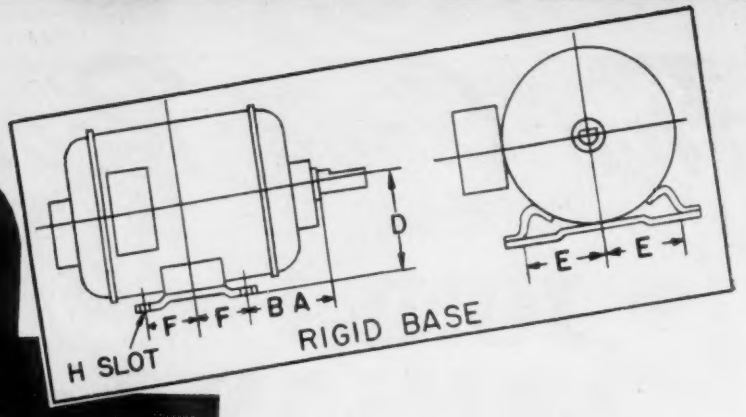
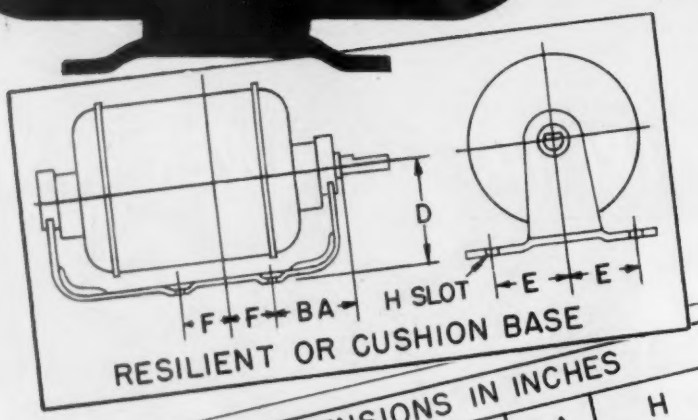
STANDARDIZATION OF FRACTIONAL-HORSEPOWER MOTORS



Set dimensions will eliminate initial application as well as replacement difficulties now encountered. Motors 1/20 through ¾ hp to be built in three standard frames



FRAME NUMBER *	DIMENSIONS IN INCHES				
	D	E	F	BA	H
42	2 5/8	1 3/4	27/32	2	9/32-SLOT
56	3 1/2	2 7/16	1 1/2	2 3/4	11/32-SLOT
66	4 1/8	2 15/16	2 1/2	3 1/8	13/32-SLOT

* FRAME NUMBER SYSTEM IS PROPOSED. SEE DISCUSSION OF "STANDARD FRAME NUMBERS"

BROAD new program of standardization for fractional-horsepower motors was recently announced by members of the motor and generator section of the National Electrical Manufacturers Association. The initial or basic standard providing a specific method of defining motor rating and performance in co-ordinated terms of horsepower, speed, breakdown torque and service factor was defined.

This basis of rating standard was established in order to eliminate initial application difficulties and to insure proper performance and long life insofar as the electrical characteristics of the motors are concerned. Although the specific basis of motor rating will be a key factor in obtaining maximum efficiency by both users and manufacturers of fractional-horsepower motors, its principal value results from the fact that machinery or appliance manufacturers can obtain proper motors from all suppliers without going through exhaustive engineering tests for each application or make of motor.

New Dimension Standards: Realizing the savings to be gained by machinery builders, motor manufacturers and users, NEMA also initiated the study of dimension standards in 1944. After two years of work, these standards were finally adopted. The new dimension standards provide for three motor frame sizes with dimensions as shown in diagram. At present time, no horsepower and speed ratings will be assigned to these frame sizes.

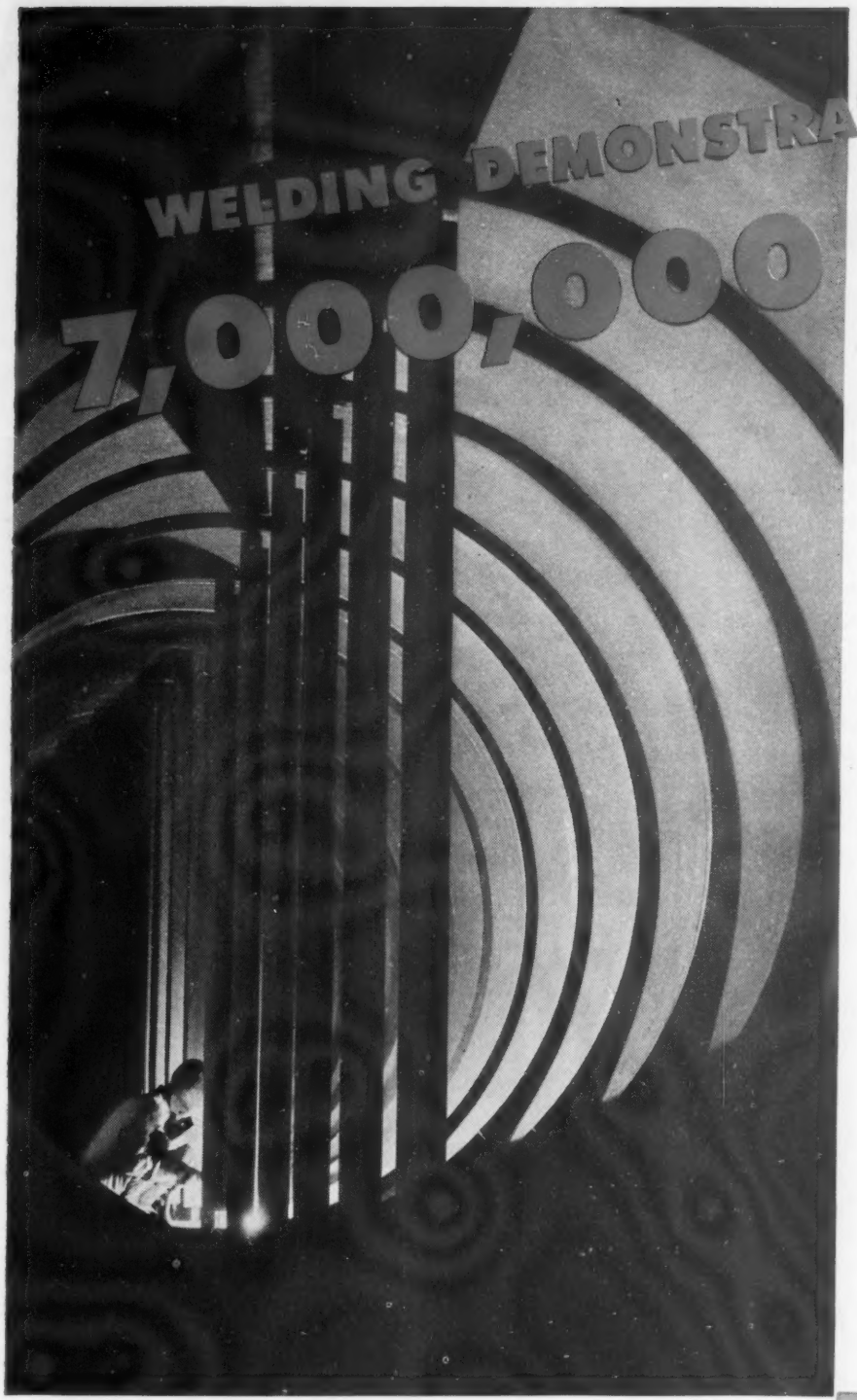
The dimensions apply to both rigid and resilient or cushion-base motors, and to motors 1/20 through ¾-hp, 1800 rpm (1 hp, 3600 rpm). The H dimension of 13/32-in. slot and BA limension of 3⅛-in. in the largest frame was established for the purpose of matching the integral horsepower 203 frame (1 hp, 1800 rpm) which has an H dimension of 13/32-in. hole and BA dimension of 3⅛-in. This will provide for interchangeability on belt-driven machines, using both fractional and integral-horsepower motors.

Standard Frame Numbers: Each motor manufacturer now uses a separate system of frame designations. Some manufacturers employ numbers, some letters and others a combination of both to designate the various motor frame sizes. There are very few cases of similarity in the systems. Consequently, purchasers and users of fractional horsepower motors found them confusing and of very little use.

In order to make the new dimension standards more useful and effective, a standard system of numbering frames was proposed. This system is modeled after the integral-horsepower system which employs frame sizes 203 through 505. Those associated with the application and use of integral-horsepower motors would be the first to give their approval for a similar system for numbering fractional frames because of the great success of the former which has been in use for approximately 16 years.

In the proposed system for numbering the frames, the frame number will be 16 times the shaft height (D dimension). By referring to accompanying diagram, it will be noted that the three frames will be 42, 56 and 66. The BA, E, F and H dimensions will be constant for any given D dimension or frame size. Suffix letters are used to indicate the same features now indicated in the integral

(*Please turn to Page* 156)



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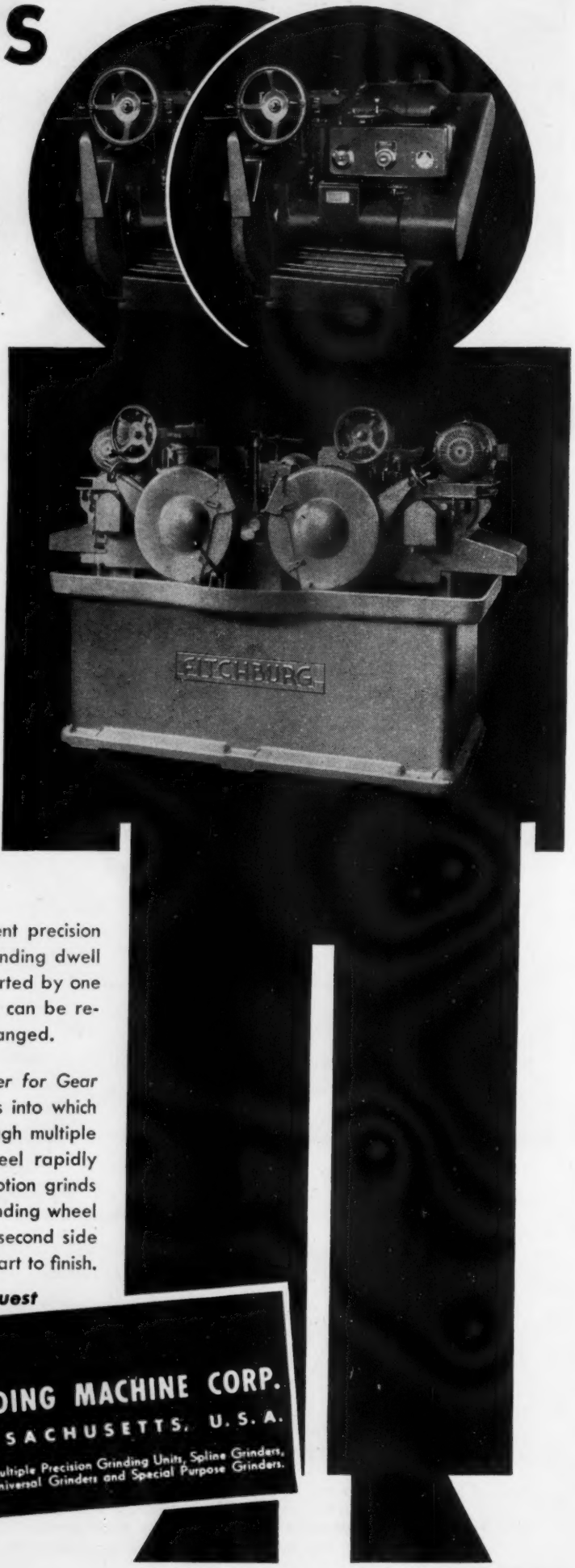

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The basis of this Fitchburg method is an independent standard interchangeable grinding head which may be mounted singly or in multiples on standard or special equipment, and may be regrouped and remounted on standard machines or on new special bases, for operations other than the one originally specified. Mounted singly, it can perform more jobs than was thought previously possible — straight or bevel gears, internal or external gears, etc. — due to its independent positioning and its ability to be set at any angle the work requires. Mounted in multiples, its production uses are even greater.

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Hot-Dip Galvanizing Practice

SUCH articles as pails, tubs, garbage cans, ash cans, funnels, oil cans, etc., which are the general line of merchandise made by stamping concerns, are included in stamped metal ware. On the finished appearance of such work depends to a large extent the marketability of this merchandise. However, there is no standard finish which satisfies all houses, some desiring small spangles and some requiring large spangles. In all cases however, smoothness of finish is desired.

Because of the fact that finish plays such an important part in the marketing of this class of work, great care must be exercised in the type of equipment and material used and the technique of operation, such as proper pickling, proper fluxing, control of dross flow and installation design.

Ample capacity of all pickling equipment is imperative and sizes of the pickling tubs must be figured carefully against production.

This class of work is pickled in sulphuric acid fully inhibited. Great care must be taken to prevent any over-etching of the surface. Careful control must be exercised over the strength and iron content of the acid. Temperature must be kept constant for each step in the technique.

After pickling, the water wash must be complete and uniform and the No. 20 neutral flux bath must be maintained constantly at the required degree Be, free from iron and also at a set temperature.

In pickling pails, tubs, and other type work which will nest, care must be taken to turn the pieces being pickled in order to avoid air pockets.

Because of the uniformity required in coating these products, charts showing the operating time of each step, strength of acids and temperature may be used effectively. They should be followed accurately in order to secure the best results.

Fig. 56 shows the exit end of the flux

By WILLIAM H. SPOWERS JR.
President
Spowers Research Laboratories Inc.
New York

Fig. 51 (right)—Installation used for zinc coating hot water tanks

Fig. 52 (below) — Modern galvanizing plant for zinc coating metal containers

Accidents happen...

Chen Wai Sze was quiet amidst the babble of voices in the old tea house beside the river.

The merchants were gathered, as was their custom, to exchange the day's news of their boats carrying precious cargo to distant cities.

Gravely old Chen listened as the merchants spoke courteous commiserations to the luckless one whose boat had capsized in the treacherous rapids, whirling to destruction the wealth accumulated through years of labor.

At last Chen spoke. "My honored brothers: the grass by the river bank is green, thick are the willow trees, always hungry are the rapids of the river. And fear of utter loss is constant in our hearts.

"Let us then bring our boats together. Let each of us place in each boat a small portion of his cargo. Thus when a boat must satisfy the maws of the river, each of us will lose a little, but none of us will lose his all."

So it was that the merchants shared the chances of loss on the great river that flows forever to the sea.

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If you take a chance that disaster will not strike you or your business, you may save a little. But disaster does strike someone—hour after hour, day after day.

Through Employers Mutuals, more than a hundred thousand policyholders share their chances of loss. Each pays his small share of the total cost; each gains protection against disaster.

What are your chances of loss today?

If you are an employer: one out of every 25 men and women employed this year will be killed or seriously injured in accidents at work.

If you drive, or your employees drive: one out of every 28 motor vehicles will kill or seriously injure a man, woman, or child this year. Hundreds of thousands of drivers will have accidents involving property damage. This damage alone will total over $600,000,000. How much could you afford to pay for one of these accidents?

Wherever you live: there will be a fire in one out of every 100 dwelling places this year, at an average cost of $325.61 per fire.

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EVERY day of the year accidents kill 260 people and seriously injure 28,100 more—at home, at work, on streets and highways. The total cost is well over a million dollars a day.

Tonight hundreds of thousands of men are with their families—men who would not be there except for the outstanding achievements of Employers Mutuals engineering service in reducing accidents and saving lives.

The outstanding reputation of Employers Mutuals for accident prevention began many years ago. Back in 1911, in Wisconsin, a group of farsighted manufacturers decided to share their chances of loss in order to lower the actual cost to each of them. That was the start of Employers Mutuals—the beginning of a story of service.

Because accidents kept the cost of insurance high, they put safety engineers on the job to wipe out the causes of accidents and to devise safer methods of working. Then came industrial nursing, first aid programs, and modern physiotherapy laboratories.

Employers Mutuals service followed the needs of the policyholders. When one needed service in Michigan, Employers Mutuals obtained a charter to operate there. Another policyholder wanted coverage in New York, then in Texas. Again Employers Mutuals went along. Today they are represented in all 48 states.

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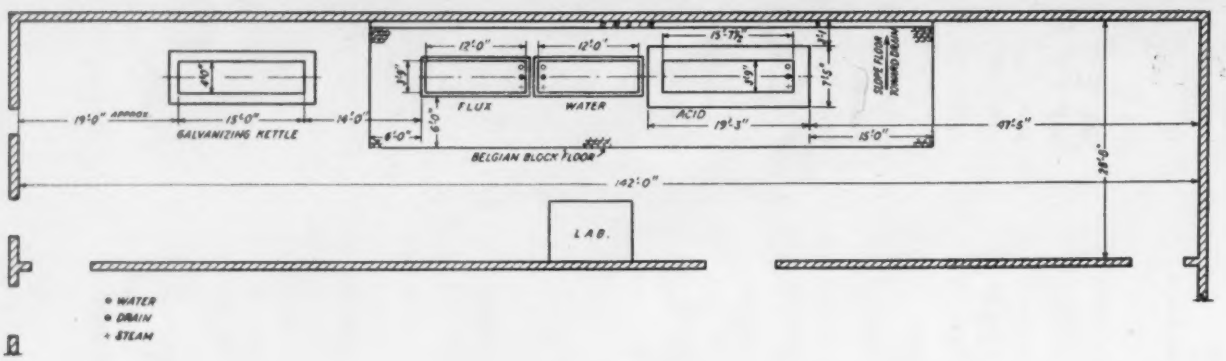


bath in close proximity to the ingo end of the galvanizing kettle. There is a definite reason for this arrangement. Stamped metal ware must emerge from the flux hot and pass through the volatile No. 20 neutral flux into the zinc hot.

Each piece of work is handled individually by specially-designed tools which will maintain contact with the product until taken from under the flux dam by the outgo end operator. Great care must be taken in the design of these tools because the take-out operator must constantly turn the product to eliminate and control the run or drip of the metal.

On account of the high finish required, the galvanizing kettle must be of generous capacity and extremely high fired. Dross must be prohibited from coming in contact with the work in any way and the zinc must be of the high-fluidity type. Even the use of addition agents must be increased in this case because the zinc must be free flowing in order to obtain the desired spangle.

Excess air currents in the room must be avoided inasmuch as a rush of cold air across the take-out end of the galvanizing kettle can easily alter the appearance of the finish.

Elimination of sal ammoniac flux spots from this class of work, has been accomplished by the substitution of the No. 20 neutral flux wash which permits no possibility of undissolved crystals adhering to the galvanized coat.

Galvanizing Range Boilers and Barrels

Because range boilers fill and empty slowly in the galvanizing kettle through two small spuds, special attention must be given to the sheets from which they are made and the pickling.

Range boilers in modern plants are pickled in sulphuric acid vertically. This is done to prevent the possibility of air pockets in the inside of the boiler. The acid must contain a substantial inhibitor and the steel plate must be free from inclusions and rolled in mill scale.

If the steel sheet is not clean and free from inclusions there is danger of hydrogen inclusion which may not show on the boiler for some time after shipment. If the sheet has rolled-in mill scale on its surface the inhibited sulphuric acid will remove this and leave a rough surface which will not permit the formation of an even spangle. Therefore, specifications for sheets that are to be made into range boilers are unusually strict.

This product lends itself particularly well to straight line technique as will be seen by the layout in Fig. 53. First comes the sulphuric pickle, water wash and the No. 20 flux, all vertically operated. The yokes are built to hold five 30-gal boilers in a gang across each tank. By this arrangement five boilers are shifted from tub to tub as the work progresses down the line to the galvanizing kettle.

The boilers are presented to the ingo end of the galvanizing kettle either from an overhead trolley or rolled down rails to a convenient point near the operator. Since the adoption of the No. 20 neutral flux wash the drying oven, which used to be necessary with muriatic flux, has been abandoned.

As shown in Fig. 57, the ingo operator chains two boilers on a lacing table which is fastened to the ingo end of the kettle; then, standing behind the guardwall he lifts the handle of the lacing table. This permits the ends of the boilers to gradually pass through the volatile No. 20 flux into the zinc. When the boilers are about half filled with zinc the ingo operator steps to the side of the kettle, throws off the lacing chain and the two boilers float off the lacing table into the zinc. A hook tool then is inserted in one of the end spuds of the boiler and the work is revolved in the zinc and pushed under the dam which holds back the volatile flux.

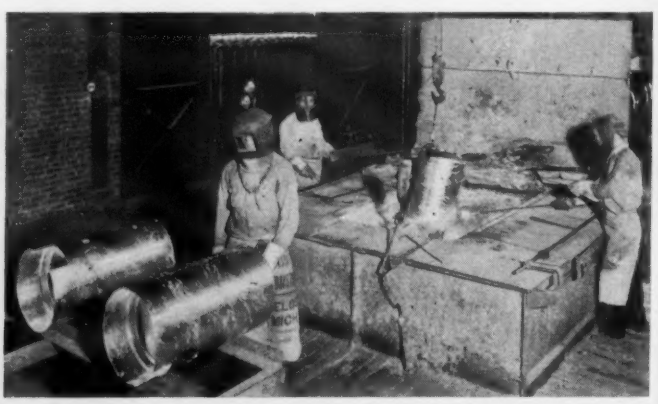
The galvanizer on the outgo end now revolves the boiler several times with a similar hook tool and then inserts what is known as the galvanizer's hook, in one of the boiler end spuds.

This latter hook is an important adjunct. It is made of 1-inch stock and is about 2 ft long having two eyes on one end, one closed and one open. The overhead slow-moving electric hoist now

Fig. 53 (above) — Layout of a straight-line galvanizing installation for zinc coating range boilers

Fig. 54 (below)—Modern range boiler plant showing a boiler being hoisted from discharge end of galvanizing kettle

Fig. 55 (right)—Modern installation for galvanizing small tanks



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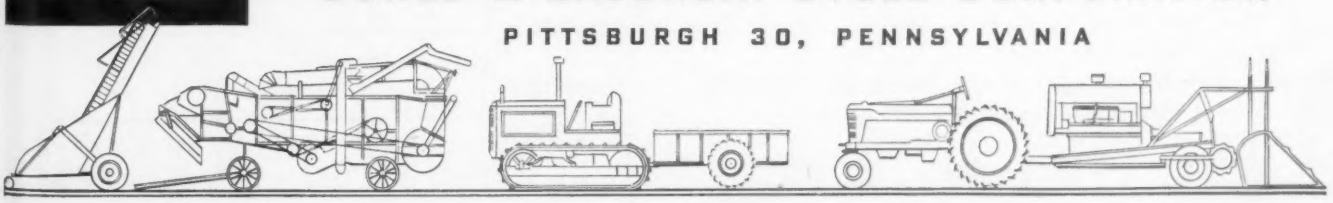

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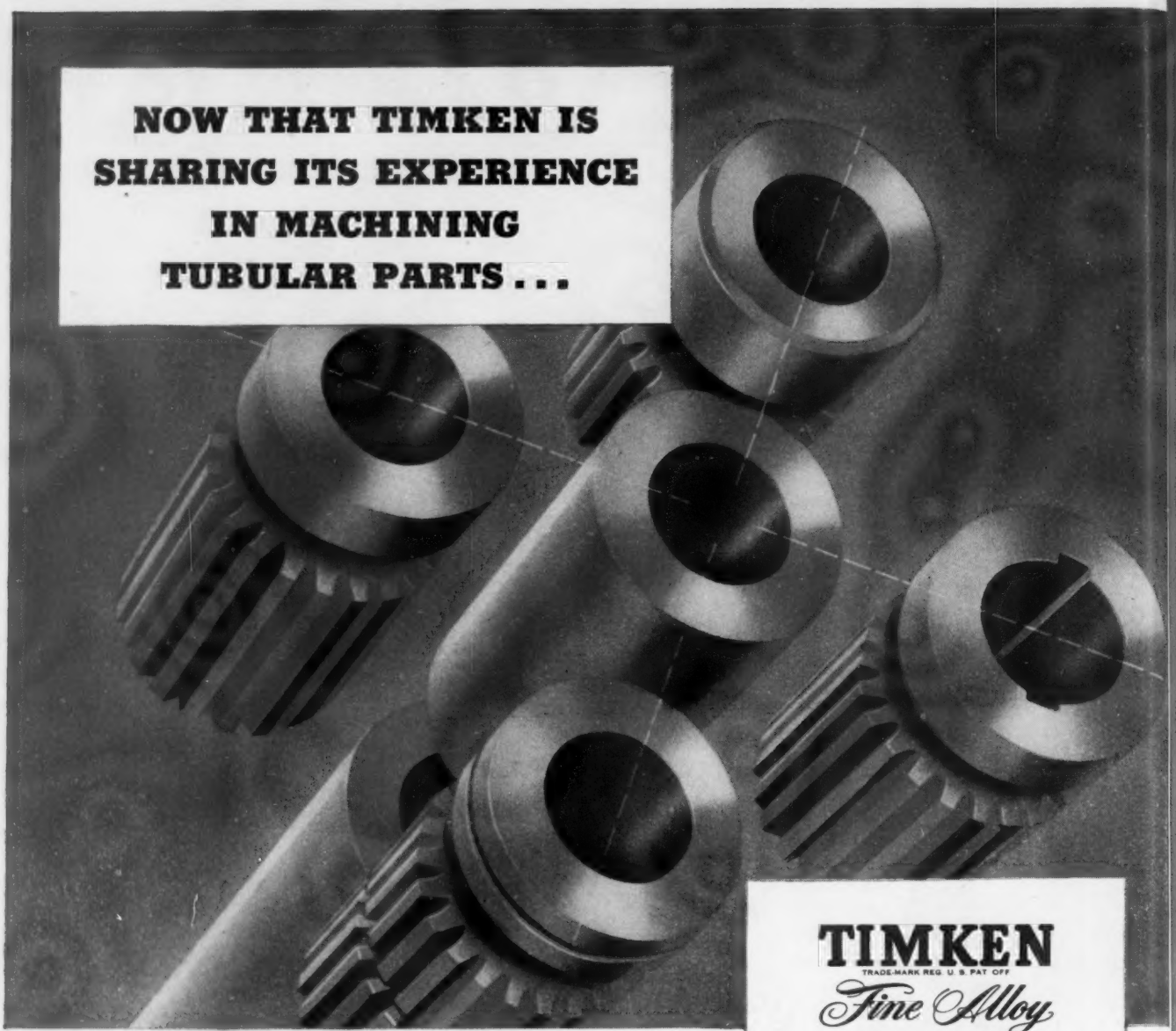

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This experience has been supplemented by detailed job analysis and production planning for scores of manufacturers using Timken Alloy Steel Seamless Tubing. That is why today the Technical Staff of The Timken Company is recognized as the foremost authority on machining tubular parts.

Savings amounting to thousands of dollars have been made in many cases by elimination of drilling operations on bar stock, reduced boring, reduced scrap losses and shortened production cycles.

And the number of parts which can be made from tubing now has been increased by successful production in Timken mills of seamless tubing with 2 inch walls. Outside diameters vary all the way from ½ inch to 10½ inches with a wide range of wall thicknesses.

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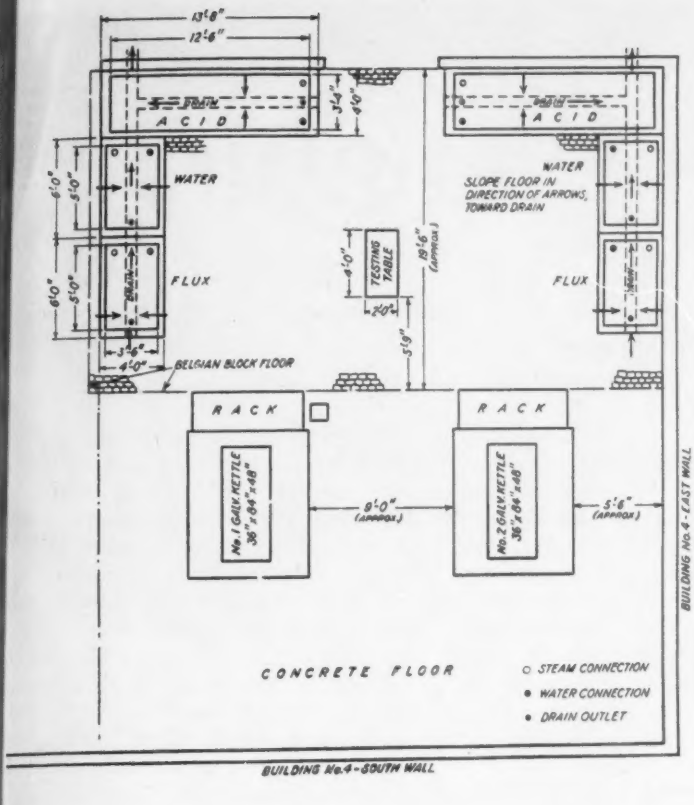
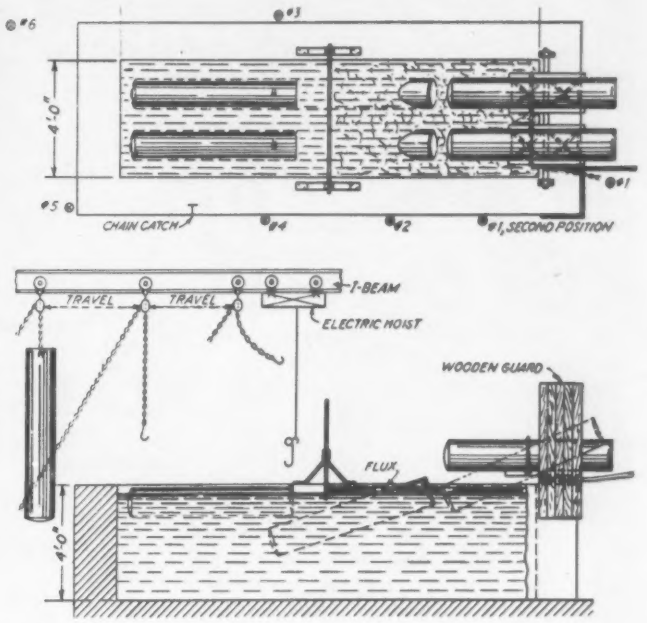


Fig. 56 (left)—Layout of a 2-unit galvanizing plant for coating stamped metal ware

Fig. 57 (below) — Schematic diagram showing how range boilers are processed through galvanizing kettle



hooks into the open eye of the galvanizer's hook and the hoist proceeds to withdraw the boiler. The removing operation must be slow, steady and continuous until the side spud appears above the surface of the zinc. The lifting should stop when the side spud has arrived at a point 1 in. above the surface of the zinc and no further.

During this entire withdrawal operation two operators standing one on either side of the kettle continuously skim the zinc oxides from around the boiler with small hand skimmers. After the draining has been completed from the side spud the hoist is again operated until the boiler is clear of the kettle for about 4 in. A hook tool is again inserted into one of the end spuds and the boiler is shaken back and forth violently to discharge any dirt which may have accumulated in the interior.

By means of a light weight, long hook tool the take-away hook on a separate trolley is then swung into the closed eye of the galvanizer's hook, the electric hoist hook falls out of the open eye and the boiler is swung to the trowling rack. Reference is again made to Fig. 57 which details this operation.

The foregoing coating technique is designed for the production of sixty 30-gal regular hot water range boilers per hour.

The lacing table previously mentioned consists of two thin rails 10 ft long and spaced about 3 ft apart. Boilers coming from the galvanizing kettle are deposited on this table and rolled back and forth by means of spud tools until the coating is fully set. The heads and bottoms are trowled free from drips and brushed with a fiber brush dipped in clean water. After the interior of the boiler is inspected with an electric light the work is forwarded to the test shop.

Because of continuous skimming the outgo end of a range boiler galvanizing kettle accumulates a quantity of oxides. These must be removed by means of a dirt ladle after each pair of boilers leaves the bath in order to maintain a clean working surface.

This is the concluding installment of the treatise on Galvanizing Practice which began in the Aug. 12 issue of STEEL. The entire 14 chapters will be published in book form and may be obtained by addressing the Penton Publishing Co., Book Department, 1213 West Third street, Cleveland 13, Ohio.

The technique of galvanizing steel barrels differs materially with the type of barrel, depending upon whether they are to be dipped assembled or with one end open or the bottom and ends separately. As a general rule, however, this operation falls under two classifications, namely, one-time shippers and repeats.

The pickling operation differs from range boilers in the case of one-time shippers in that the barrel shells are pickled horizontally. The pickling vat has a false bottom which slants from one end to the other so that the shells can be rolled one after the other. This is not the case however, with the water and No. 20 neutral flux vats. Otherwise the pickling technique in the case of barrels is similar to that used in the case of range boilers.

The shells, bottoms and ends of one-time shippers are handled through the galvanizing kettle in a similar manner to stamped metal ware.

Permanent or repeat barrels, however, usually are handled mechanically. The latest method for galvanizing permanent barrels with spuds in one end only, has been perfected at considerable cost.

Ground Flat Stock Steel Available in Small Sizes

Electric furnace steel in precision ground flat stock sizes designed to eliminate machining operations needed to reduce mill stock to size is being marketed by Capewell Mfg. Co., Hartford, Conn. Annealed, and in standard 18 in. lengths and in thicknesses ranging from 1/64 to 1 in., steel has carbon and alloy content that permits hardening up to 66 rockwell C.

Instructions for hardening and tempering in either oil or water are printed on shipping container. Stock is said to be precision ground to plus or minus 0.001-in. of stated thickness. Both edges and ends are squared and surfaces are smooth.

Carbides in Powder Metallurgy

Physical properties can be controlled carefully in making parts from carbides of tungsten, titanium or other metals with metallic binders such as nickel or cobalt

HARD metal carbides—consisting of the carbides of tungsten, tantalum, titanium, or other metals with a metallic binder such as nickel or cobalt—possess all of the advantages to be derived from the fabrication of all kinds of products by the powder metallurgy process. For example, carbide products require a minimum amount of finishing to complete individual pieces, and those that do require finishing may be easily ground and lapped to any desired dimensions or finish.

The metal in the finished part also has an unusually high degree of purity even among the powder metals, inasmuch as there is little chance of contamination of the raw materials. In addition, there is little waste of the raw materials in either the manufacture or the fabrication of the hard metal carbides.

The compositions and consistency of the various grades of carbides also can be controlled accurately. However, such physical properties as density, hardness, wear resistance, toughness, grain size, etc., can be accurately controlled and varied, between limits, simply by varying the proportions of the major ingredients.

By JAMES R. LONGWELL
Director of Research & Engineering
Carboloy Co. Inc.
Detroit

The variation of the methods currently available for producing carbide parts makes possible a wide variety of shapes and sizes. Thus, small carbide parts can be produced rapidly in automatic, or pill presses, where production warrants. The hot press method makes possible the production of far larger pieces of carbide, especially thin-walled sections that would collapse in the conventional sintering furnace. Special shapes can be formed readily from carbide ingots before they are sintered, either on manually operated or automatic machines. Bars, rods, and tubes of many shapes can be produced by extrusion.

Properties of Carbide Powder Metals: Although powder metals as a class suffer from such disadvantages as relatively low tensile and impact strength, in fact, a general lowering of most physical properties, this is not true of the carbide

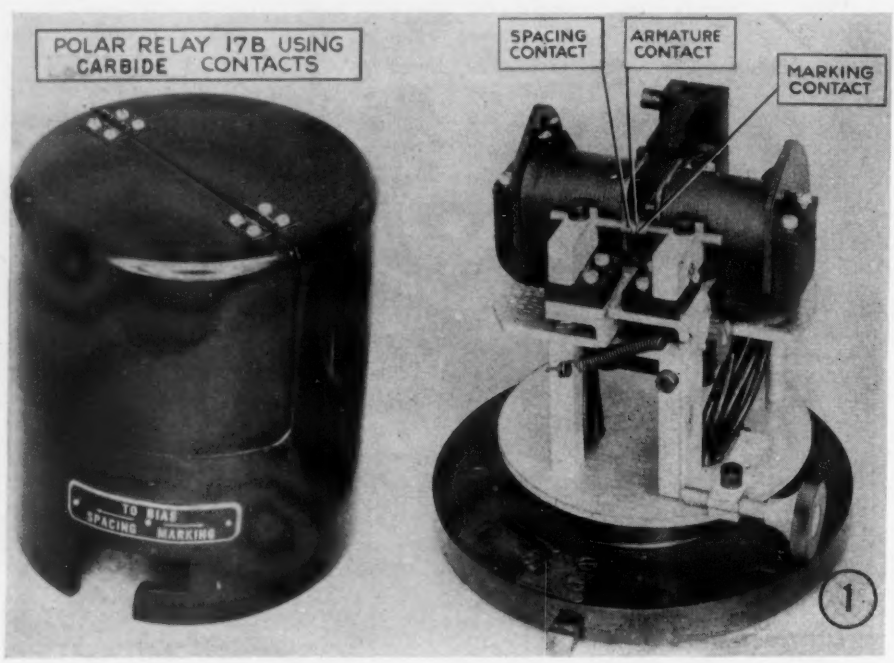
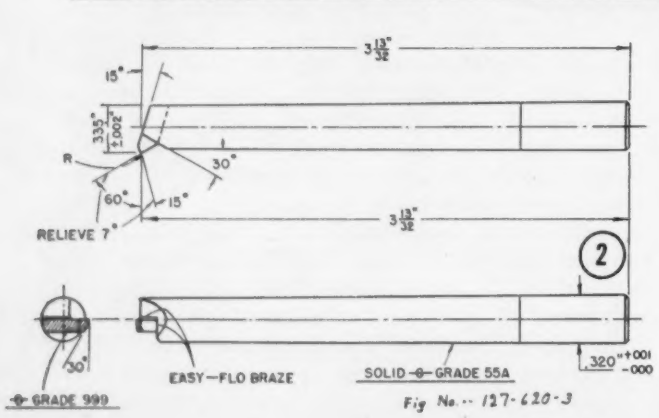
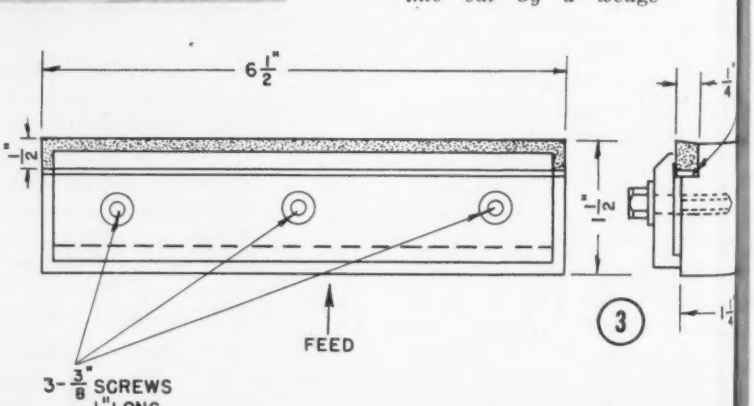


Fig. 1—Carbide contacts of the type shown here are self-cleaning in that material loosened through constant arcing drops away instead of fusing to opposite contact

Fig. 2—Experimental boring bars of this design, made of solid Carboloy and tipped with cemented carbide were used for boring holes in which ratio of length of bore to bore diameter was 7:3

Fig. 3—Used for reconditioning extremely hard chilled iron rolling mill rolls, this carbide tool is fed into cut by a wedge





What's Right for Round Jobs?

WHICH is the most efficient modern technique for forging "round jobs"? It can be either, mechanical press or upsetter, depending on your particular requirements.

With a wide range of capacities in mechanical presses *and* upsetters, TUBE TURNS is a good mass-production source for these "round jobs."

Both techniques at TUBE TURNS give you forgings—properly held to specified tolerances—with metal that has gone all the way out to the end of the dies, perfect flow lines and *forged* tensile strength throughout.

TUBE TURNS' mechanical presses and upsetters are closely coordinated under one roof with complete die designing, die making, laboratory, and rough machining facilities. You get a highly desirable continuity of effort from start to finish of your job.

Send your prints for the recommendations of TUBE TURNS engineering staff. TUBE TURNS (Inc.), Louisville 1, Kentucky.

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FORGINGS FOR INDUSTRY

DISTRICT OFFICES at New York, Washington, D. C., Philadelphia, Pittsburgh, Cleveland, Detroit, Chicago, Houston, San Francisco, Los Angeles

powder metals. Carbide powder metals are said to offer physical properties, such as high hardness at elevated temperature and high mechanical strength that are in many ways superior to those obtainable with any other material, regardless of method of manufacture or fabrication.

Normal Hardness: Carbide metal possesses extreme resistance to penetration and scratching. In connection with the former, commercial grades of cemented carbides have a rockwell A hardness (read on the rockwell C scale but with a 60 kg load rather than the standard load of 150 kg) of from 85 to 93. The abrasive or scratch hardness of this powder metal ranges between 9 and 10 on Mohs' geologists' scale of scratch hardness.

A number of the uses of the hard metal carbides are dependent upon this property of high hardness at normal temperatures. For example, Carboloy brinell balls are so hard that there is little tendency for them to flatten out and give a deceptive reading when testing the harder steels. This hardness also makes carbide wire drawing dies effective.

Red Hardness: There are two factors to be considered in any discussion of the phenomenon known as "red hardness". First, materials possessing red hardness are just as hard after being heated and cooled as they were before heating. Second, red hard materials retain a greater degree of their hardness when heated to red heat than do other materials.

Although powder metals in general do not possess the quality of red hardness, carbides may be heated and cooled repeatedly without any appreciable loss in hardness at normal temperatures. In addition, these particular powder metals do not lose hardness rapidly even when heated to elevated temperatures. For instance, when heated to 1300° F, cemented carbides retain a rockwell hardness of between 83.5 and 84.5. This corresponds to a brinell hardness of between 660 and 680.

This property of red hardness, of course, is extremely useful in cutting tools. The higher hardness at elevated temperatures permits machining at high speeds. It is the high red hardness of carbide tools, together with a new conception of machine tool design which has made possible such revolutionary developments as the turning of steels from 5 to 10 times the speeds commonly used a few years ago; milling steels at speeds often in excess of 500 surface fpm; and milling aluminum alloys at speeds upwards of 12,000 surface fpm.

Carbide's red hardness also makes this powder metal useful for such items as chilling or quench blocks used for tempering razor blade stock. The blocks are mechanically attached to cast iron or brass water cooling jackets. In use, two sets of the water-cooled carbide blocks are pressed together as the heated safety razor blade stock passes between them. Contact with the cold carbide tempers the blades. These blocks also prevent the thin steel from wrinkling and warping while the blades are being tempered.

Modulus of Elasticity: The modulus of elasticity of the metal carbides is surprisingly high, ranging from about 73,000,000 psi and up according to the grade of carbide. Currently, experiments are being conducted with such machine parts as boring bars made entirely of solid Carboloy metal to determine the extent to which advantage can be taken of the material's ability to resist twisting. Boring bars or tool holders have tools mounted on one end to do the actual boring. So far, excellent results

(*Please turn to Page* 159)

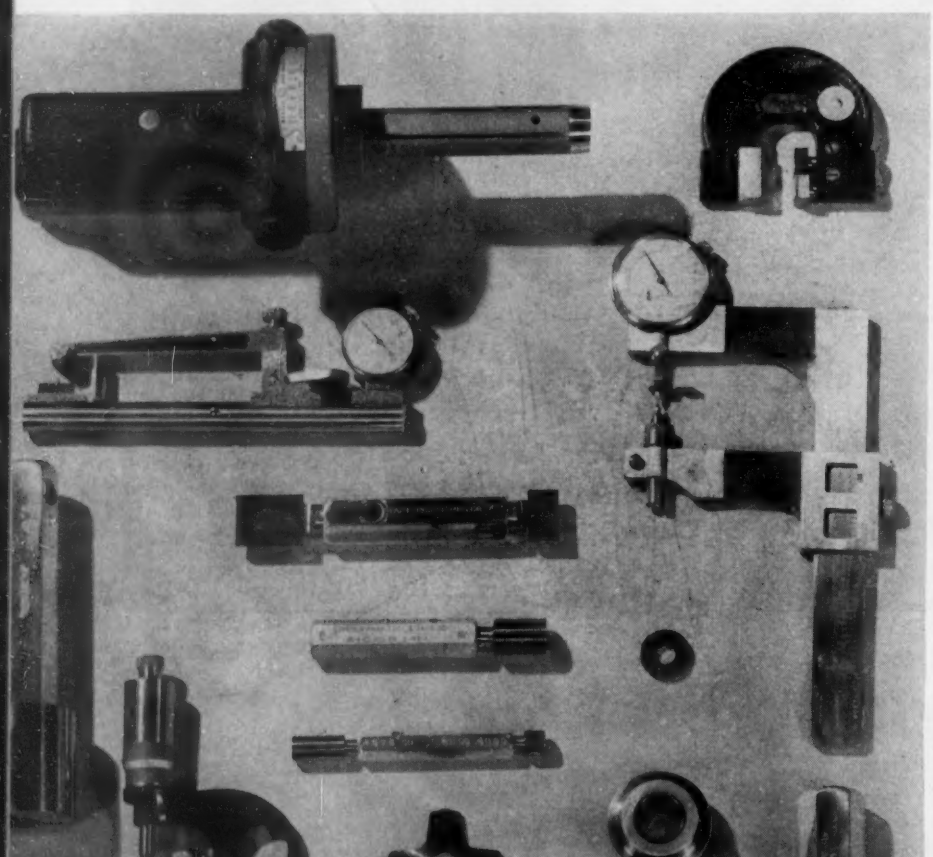
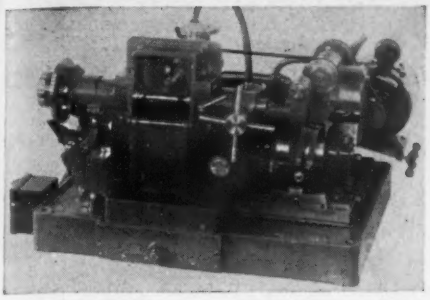


Fig. 4—Gages made of cemented carbides

Fig. 5—Variety of shapes made of cemented carbides

Industrial Equipment

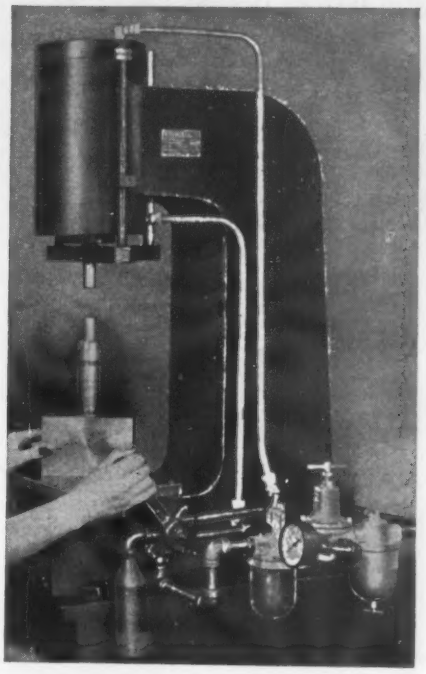


Gear Cutting Machine

Automatic from start to completion of last cut, a new pinion and gear cutting machine, directly above, introduced by Waltham Machine Works, Waltham, Mass., is capable of machining gears up to 2¼-in. pitch diameter with a 2 in. length of cut. Adaptable for either bench or pedestal mounting, it is a single cutter machine, with revolving cutter making successive cuts on blanks held and indexed by work spindle and supported by tail center. Motor is connected to shaft that drives cutter spindle, coolant pump and indexing mechanism, as well as cam shaft which is driven through a worm and gear. Although a 120 division index is supplied with machine, others are available. Cutters used on machine are regularly 1 in. in diameter with a ⅜-in. hole, but other dimensioned cutters can be adapted by means of arbors. Stroke can be varied from 1.4 to 2.4 in.
Steel 12/2/46; *Item No.* 9971

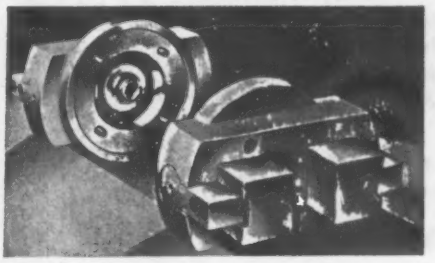
Boring Machine

Rough and finish boring, counterboring, finish facing and chamfering are possible with the double end boring machine, immediate right, built by W. K. Millholland Machinery Co., 1048 Fairfield avenue, Indianapolis 5. Work is clamped in air operated fixture and roughing cycle is initiated by a pushbutton. As roughing head returns to starting position, it actuates a limit switch which in turn starts the cycle for the automatic finishing operation. For rough boring operation, feed starts with coarse feed and automatically changes to fine feed for counterboring with a dwell for finishing up facing. Profile of the cams on the units determine rate of feed as cam rollers are kept tight against cams by pneumatic counterbalance. At completion of machining cycle, tool spindles are withdrawn clear of work and are stopped. Both fixtures are located on welded steel bed by means of hardened key and insert.
Steel 12/2/46; *Item No.* 9973



Arbor Press

Air powered all steel welded construction arbor presses capable of performing very low squeezing actions and giving up to 200 sharp punch press ram blows per minute are announced by Studebaker Machine Co., 1221 South Ninth avenue, Maywood, Ill. Made in two models, the Hurricane Six and Eight, they are capable of developing 1 and 2-ton ram pressure, respectively, on 80 lb air pressure, or 1½ and 3 tons on 120 lb pressure. All pressures are developed on both up and down strokes. Presses, such as the one shown above, can be operated by hand lever, foot pedal or push button solenoid control. Ram pressure can be set from a few pounds to the maximum, and stroke can be regulated from a few thousandths to 6 in.
Steel 12/2/46; *Item No.* 9969



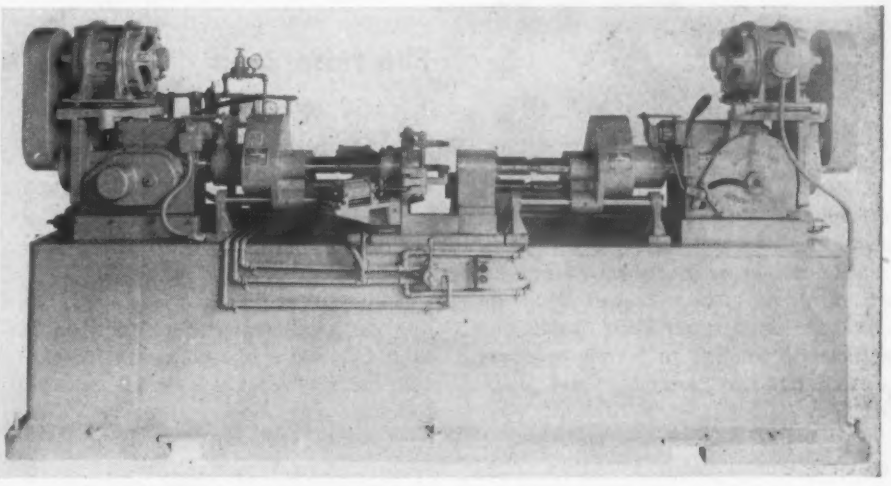
Power Chuck

Primary use of Series 1400 and 1400-A self-centering, power operated, 2-jaw chucks made by Skinner Chuck Co., New Britain, Conn., is for production work on objects of irregular shape. Work holding soft jaws are easily adapted to size and shape required. Semisteel box-body chuck is solidly bridged through the center to eliminate springing under severe stresses. With its three moving parts, a wedge and two jaws, operating on collet principle, extreme accuracy and powerful gripping pressure is assured. Maximum capacity of chuck, inside jaw holding screws, is 4½-in. Chuck, directly above, is offered in 8¼ and 12 in. diameter sizes.
Steel 12/2/46; *Item No.* 9970

Low Speed Tachometer

Available for direct measurement of speeds down to 10 rpm and 1 fpm is the low speed hand tachometer type 25B, manufactured by Metron Instrument Co., 432 Lincoln street, Denver 9. It has 3 ranges of 10 to 200, 20 to 400 and 50 to 1000 rpm.

Tachometer consists of two units, the head of which is normally held in left hand when making measurements, and indicating unit which is normally held in right hand. Finger tip control is provided on indicating unit so that speed



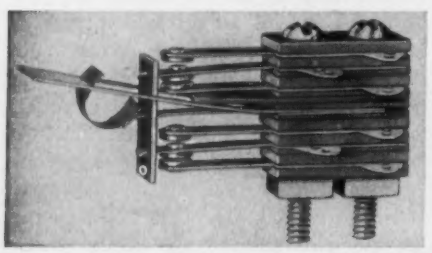
(All claims are those of respective manufacturers, for additional information fill in and return the coupon on page 141.)

range can be changed by thumb of right hand while making a measurement.

Accuracy of tachometer is 1 per cent of full scale. Head contains only one rotating part which is mounted in permanently lubricated ball bearings.
Steel 12/2/46; *Item No.* 9752

Open Blade Switch

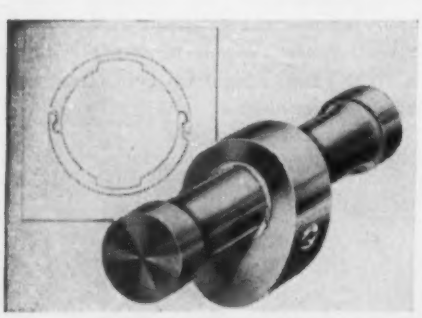
A new, compact snap-action open blade switch for two pole applications is announced by Acro Electric Co., 1323 Superior avenue, Cleveland 14. Constructed with the patented beryllium rolling spring, and made with both single and double throw contacts, the standard



operating pressures are from 3 to 5 oz. The switch is furnished with terminals, as illustrated or at the rear. Its overall dimensions are 2⅛ x ⅜-in. and it is rated at 15 amp, 125 v ac with a movement differential of approximately $\frac{1}{16}$-in.
Steel 12/2/46; *Item No.* 9962

Retaining Ring

Developed by Truarc Sales division of Waldes Kohinoor Inc., 47-10 Austel Place, Long Island City 1, N. Y., a new E-shaped ring provides a large protruding shoulder on shafts of 3/32-in. diameter and over and, when sprung into



a comparatively deep groove, will withstand considerable thrust loads. Three protrusions, equally spaced, form the abutments in groove of shaft while recesses between protrusions make ring sufficiently resilient to permit necessary spread for easy assembly and disassembly.

Installed in a radial direction requiring no special tools, ring is suited for application where a shaft is inaccessible in a longitudinal direction.
Steel 12/2/46; *Item No.* 9785

Dust Collector

Model 1150 Dustkop dust collector, is designed to operate under extremely heavy dust loads peculiar to production buffing and polishing work, according to Aget-Detroit Co., First National building, Ann Arbor, Mich. Besides a cyclone separator and spun glass filter as first and second stage air cleaners, it includes

a high compression filter, a new type filter seal and cyclone stack deflector.

High compression filter serves to stop all particles of lint and polishing dust at its surface. Result is the lint and dust forms a mat on under side of filter. The mat is allowed to build up and automatically becomes a filter of its own.

A sponge rubber seal added at the filter edge insures effective seal at all times. Deflector positioned at outlet of cyclone stack distributes dust-laden air uniformly permitting the mat of lint to form evenly over under side of filter.
Steel 12/2/46; *Item No.* 9817

Fire Hose Reels

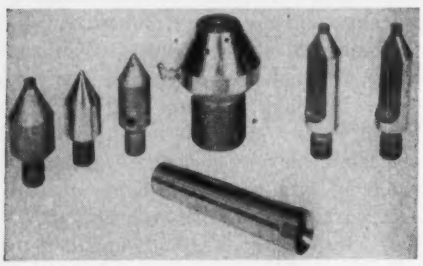
Special nozzle, handle, shut-off valve and an ample supply of hose are included in the carbon-dioxide hose reel installation currently offered by Walter Kidde & Co. Inc., Belleville, N. J., for fighting flammable liquid and electrical fires.

One or more cylinders of carbon dioxide stored as a liquid under 850 psi may be employed with the equipment. Multi-cylinder applications may use each cylinder singly, or release all cylinders simultaneously. Local or remote release mechanisms (cylinders located at a distance from reel) are provided.

Reel accommodates up to 100 ft of ½-in. hose. Supply pipe for hose reel is normally located on left side, but if installation details require, reel can be changed to locate supply pipe on right side, with hose still unwinding from back of reel. A brake prevents unreeling more hose than is required.
Steel 12/2/46; *Item No.* 9821

Machine Center

Black Drill Co., division of Black Industries Inc., Cleveland, is now manufacturing a line of patented machine centers consisting of a single shank and an assortment of six noses which thread into the shaft. Once the shank is placed

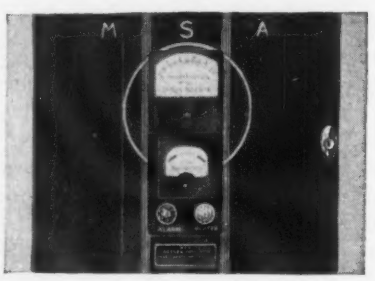


in the spindle of the head or tail stock, it never needs to be removed—noses are changed to suit the requirements of the work.

Centers are made in a range of sizes from No. 2 to 12 for lathes and grinders, with Morse, Brown and Sharpe and Jarno tapers, and with straight shanks for screw machines.
Steel 12/2/46; *Item No.* 9819

Oxygen Indicator

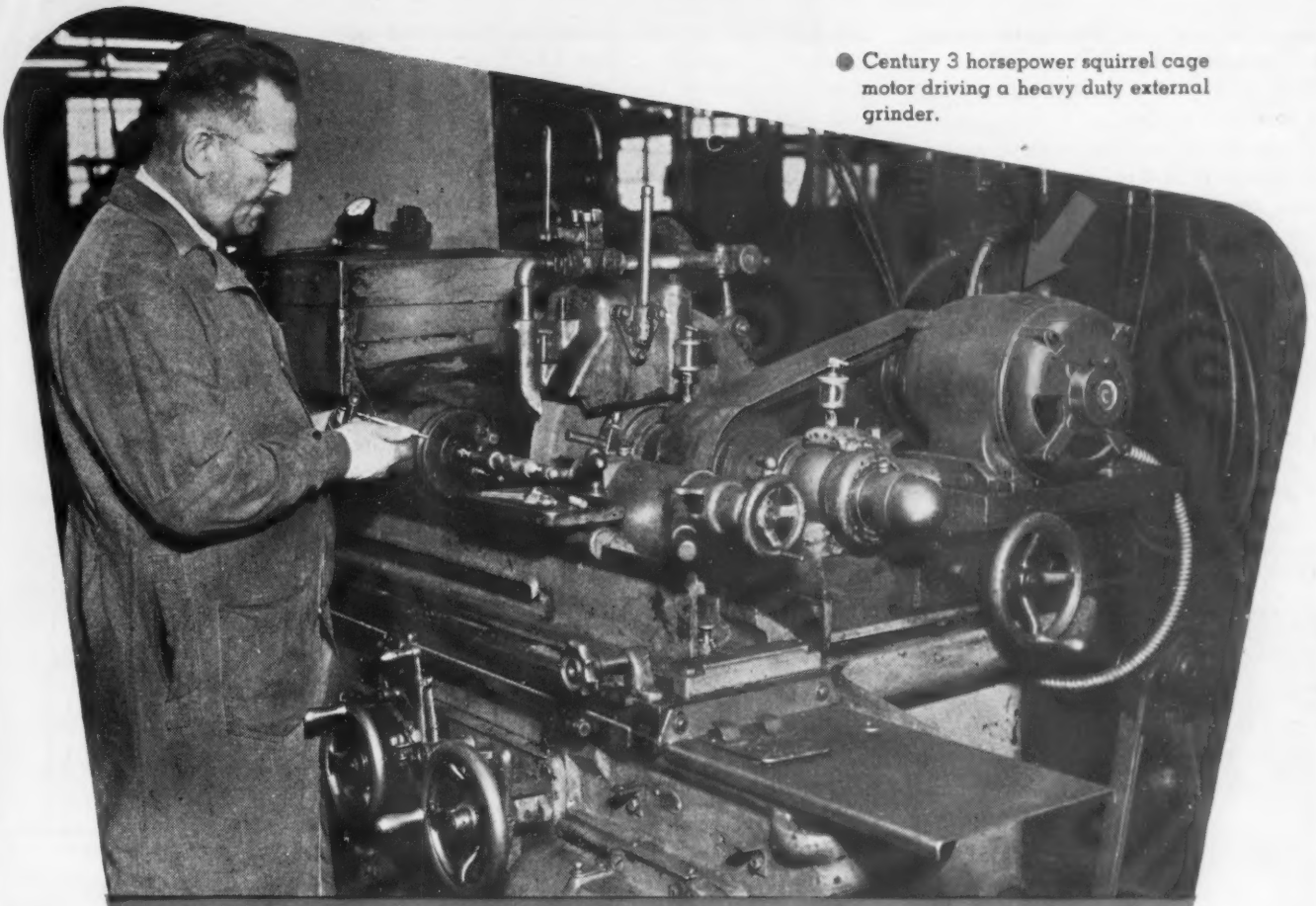
Oxygen indicator for measuring oxygen content of gaseous mixtures in chemical, metallurgical, petroleum and allied industries is latest instrument announced by Mine Safety Appliances Co., Pitts-



burgh. Most important element of this type C indicator is its electrolytic detector cell. Polarization in cell causes hydrogen to be deposited on carbon pole.

When a gas sample containing oxygen is passed through the hollow carbon electrode, diffusion through the porous carbon causes oxygen to combine with electrolytic hydrogen, reducing internal re-

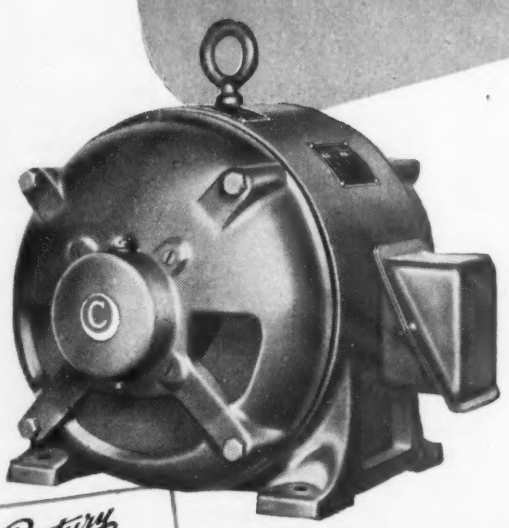
(All claims are those of respective manufacturers, for additional information fill in and return the coupon on page 141.)



● Century 3 horsepower squirrel cage motor driving a heavy duty external grinder.

Century Motors' *Accurate Balance*

Helps Maintain Machine Tool Accuracy



Accurate mechanical and electrical balance gives Century motors the smooth operation necessary to keep vibration to a minimum — to help maintain all the accuracy built into your machine tools.

The motor frame and end brackets are ruggedly built and accurately machined to form a rigid housing. Mounting feet are accurately machined — bearings are precision finished — scientific cooling system carries off heat — windings are sealed with Century triple insulation. All these features and many more give Century motors the stamina to maintain their freedom from vibration and to withstand the toughest kind of operating conditions.

They are built in a wide range of types and sizes from 1/6 to 400 horsepower to meet nearly any electric power requirement. Specify Century on all your electrically powered equipment.

Century C MOTORS

CENTURY ELECTRIC COMPANY, 1806 Pine St., St. Louis 3, Mo.

Offices and Stock Points in Principal Cities

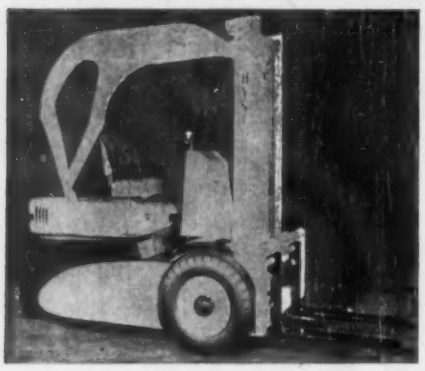
497

sistance of cell and causing its current and voltage output to be increased. A direct reading meter, indicates percentage of oxygen in sample.

Indicator is available in three ranges: 0 to 0.5, 0 to 5, 0 to 10, and 0 to 25 per cent. Under constant pressures of less than 12 in. of water, an external motor-driven pump is utilized to push the sample through the instrument. At higher constant pressures the gas readily flows unassisted.
Steel 12/2/46; *Item No.* 9814

Lift Truck

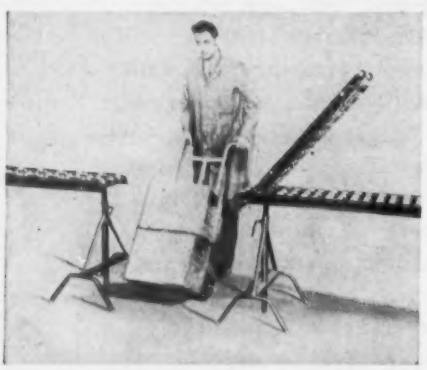
New pneumatic tire, 4000 lb fork-type lift truck, termed the Hyster 40, is announced by Hyster Co., Portland, Ore. Using a Wisconsin air-cooled motor,



trunnion steering and 7.00 x 12 in. pneumatic tires, the truck is adapted for use over any type of indoor or outdoor road surfaces.
Steel 12/2/46; *Item No.* 9820

Hinged Conveyor Section

Hinged conveyor section for use in permanent lines of standard gravity conveyors is being produced by Rapids-Standard Co. Inc., Grand Rapids, Mich. It

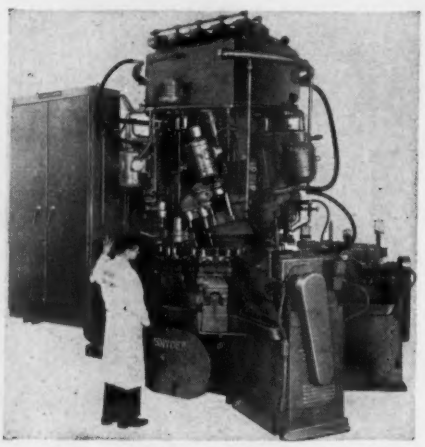


can be used to bridge an aisle way for passage of personnel, trucks or equipment by providing a 36 in. open passage-way through conveyor line.

Hinged section is opened simply by lifting movable part, swinging it upwards and back until it rests securely on the stationary section. It consists of 36 in. of movable section hinged to an 84 in. long stationary section, making a total of 10 ft.
Steel 12/2/46; *Item No.* 9803

Multi Purpose Machine

Milling, sawing, drilling, reaming, tapping, countersinking, counterboring and burring operations are performed on automobile connecting rods by this automatic special, illustrated here, built by



Snyder Tool & Engineering Co., 3400 East Lafayette, Detroit 7. Rods are machined complete except for bearing cap joint faces and crank and wrist pin holes. Dual work-holding fixtures are mounted on a 12-station, power driven Geneva index table of center column machine. Machining units have individual motors and drive through a change-gear box and V-belts. All units are hydraulically fed except tapping head, which is traversed hydraulically and lead-screw fed for work stroke. High speed steel tools operating at 60 sfpm are used. Tapping is performed at 30 or 40 fpm.
Steel 12/2/46; *Item No.* 9968

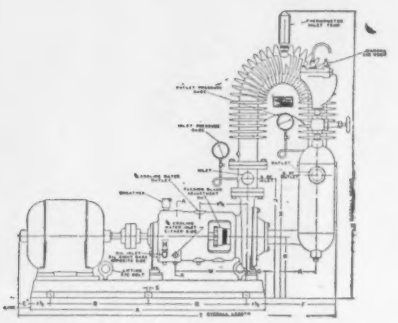
Truck Refueler

A self-powered, easily maneuvered platform-type truck with 250 gal fuel tank and functional equipment is a recent addition to the Chore Boy line made by Buda Co., Harvey, Ill. Weighing 2200 lb, it has an electrically welded steel frame and a 7.7 hp air cooled engine. Truck has two brakes, a foot brake and an automatic brake which is applied when operator leaves seat. Compartment behind driver's seat accommodates 12 qt of lubricating oil, pump control valves and space for starter, generator and batteries. Rear compartment contains hose reel, meters, water separator and levers for pump clutch, internal valve and motor speed control. Unit is capable of pumping fuel or oil from underground into its own tank.
Steel 12/2/46; *Item No.* 9956

Condensate Return System

High-pressure condensate return pump, manufactured by Cochrane Corp., 17th street and Allegheny avenue, Philadelphia 32, is driven by a 25 hp motor that utilizes a flexible coupling between pump and motor. A silent jet permits more convenient installation since pump noise is eliminated.

Centrifugal pump draws water from thermo-fin priming loop and discharges it as high velocity jet through jet pump nozzle. This jet strikes returned hot con-

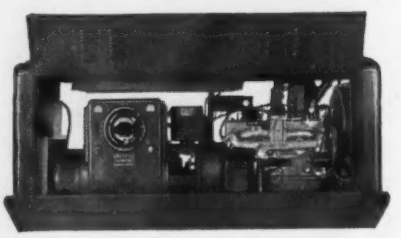


densate flow through venturi-shaped mixing tube and into thermo-fin priming loop. Additional volume of condensate introduced into constantly filled loop results in discharge of an equal volume through air separator to boiler.

Hot condensate and entrained air are drawn rapidly from processing equipment by jet pump. Air is eliminated from the circuit in passing through air separator and condensate and is returned to boiler at maximum temperature and pressure.
Steel 12/2/46; *Item No.* 9799

Combination Drive Welder

Combination drive welding machine built by Hobart Bros. Co., Troy, O., consists of standard 300 amp generator and 20 hp induction motor mounted on a



heavy solid shaft coupled to a Chrysler 6-cylinder industrial engine through an over-running clutch coupling. Coupling allows engine to drive welding generator. Should engine be stopped and generator be driven by electric induction motor,

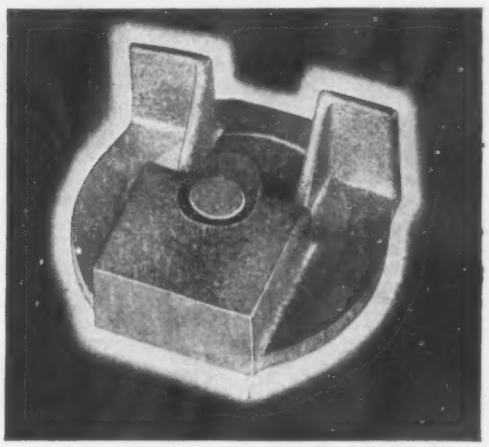
(All claims are those of respective manufacturers, for additional information fill in and return the coupon on page 141.)

Scovill
NON-FERROUS
FORGINGS

When SCOVILL becomes your METAL-PARTner

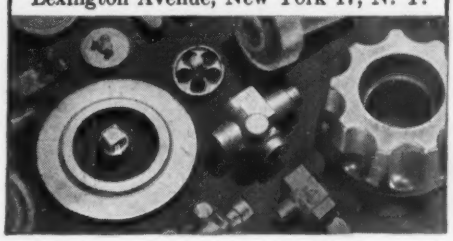
PRECISION FORGINGS LIKE THESE MAY PREVENT REJECTIONS OF EXPENSIVELY MACHINED PARTS

THE PROBLEM: An important component in an air-operated control instrument, this sand casting was unsatisfactory. Although tinned to prevent porosity, there were many rejections due to pressure leaks—but this could be determined only after intricate, costly machining had been completed. Also, the casting's natural surface roughness was unattractive.

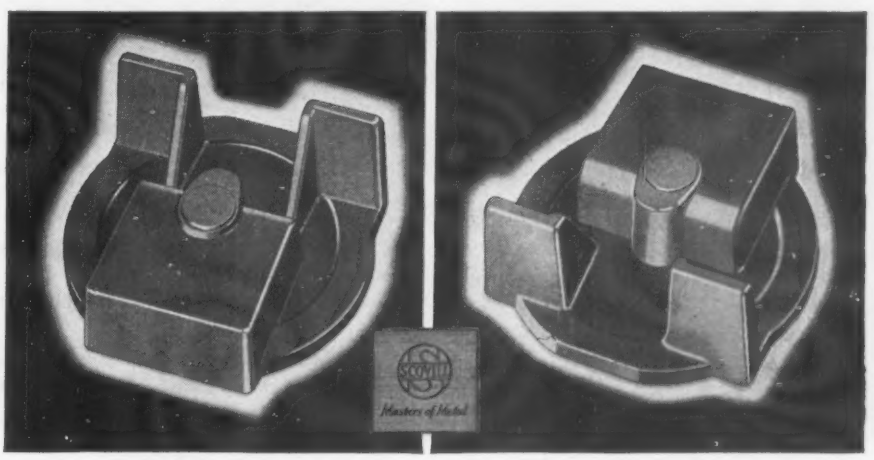


GET THE FACTS ON SCOVILL

If the metal parts you're now using are not entirely satisfactory, it may be worth your while to call in Scovill. Long experienced in every phase of non-ferrous forging, and with complete facilities for precision machining, we have solved many complicated problems by carefully considered changes in method or design. With Scovill as *your* METAL PARTner, this broad experience is immediately directed towards getting the improvements you want—in quality, performance or economy. Let us tell you how . . . Fill in the coupon and mail it today. Scovill Manufacturing Company, Waterbury 91, Conn. *Export Department:* 405 Lexington Avenue, New York 17, N. Y.



SCOVILL'S SOLUTION: Although the initial cost is higher than the sand casting it replaces, this Scovill precision forging makes possible over-all savings for the manufacturer. The dense grain structure of the forging eliminates all expensive rejections due to porosity and, at the same time, furnishes a smoother, more attractive finish which improves the appearance of the product . . . A typical example of how Scovill combines improved quality with lowered cost.



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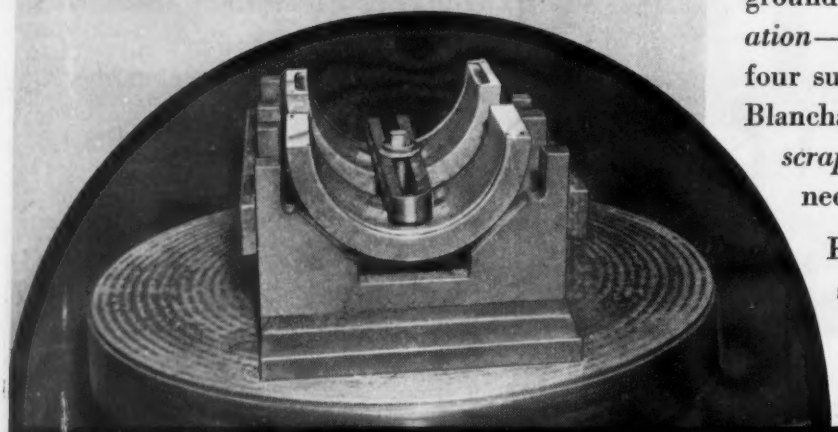

GRINDING HALVES of TURBINE BEARING

Material: steel and bearing babbit

Size (assembled): 12⅞" O.D., 9⅛" I.D., 7⅝" LG.

Held in an inexpensive fixture on the magnetic chuck of a No. 18 Blanchard Surface Grinder, *both halves* of the turbine bearing are finish-ground at the parting joint *in the same operation*—1/64" is removed from each of the four surfaces. The flatness and finish of the Blanchard-ground surfaces are such that *no scraping* or other means of correction is necessary to provide *oil-tight joints.*

Production is 4 pairs or 8 halves (16 surfaces) per hour. This includes loading and unloading the pieces in the fixture.

The bearing halves are then assembled and held together in a simple clamping fixture. Returned to the Blanchard—*no machine changes are necessary*—both ends of the assembled turbine bearing are finish-ground. (1/64" is removed from each end.) The Blanchard-ground end surfaces are *flat and parallel,* allowing the subsequent finish-boring operation to be registered from either of them.

Production is 8 half bearings (16 surfaces) per hour, which includes assembly and clamping time.

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MATERIAL SAVING
CLOSE LIMITS
FINE FINISH ✓
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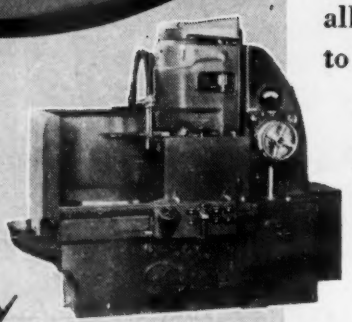

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BLANCHARD

The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

clutch will over-run, or free wheel, action being entirely automatic. Induction motor is wound for dual voltage 220/440. Change over is made by throwing a double-throw knife switch.
Steel 12/2/46; *Item No.* 9815

Drawing Press

New 250-ton double-action drawing press, manufactured by Watson-Stillman Co., New York, features a single-action die cushion cylinder with a die ram of 11 in. diameter and with a 14 in. stroke. When used as an ejector, it operates at 3.9 tons on 100 psi pressure.

Press is self-contained, operating with a vane-type oil pump. Platen is 48 in. square and operating stroke is 36 in. The unit operates at a pressure of 2000 psi.

Machine has manual control and single-cycle automatic operation. Input is 440 v 3-phase alternating current at 60 cycles. Operating speeds for this press are: Advance, 600 ipm, pressing, 82 ipm and return, 725 ipm.
Steel 12/2/46; *Item No.* 9789

Watt-Var Autoswitch

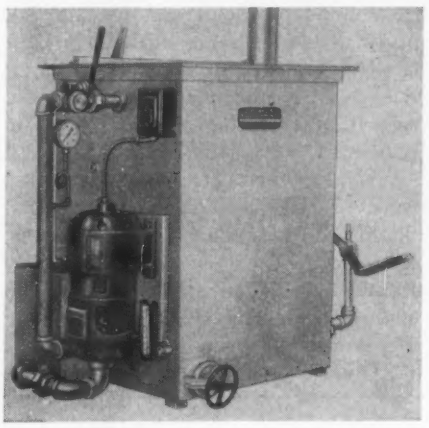
Watt-var autoswitch that permits recording of both watts and vars on a single instrument is being produced by Meter and Instrument Division, General Electric Co., Schenectady, N. Y. It is for use in central station, industrial-plant substations, and similar applications to check load lines to determine whether additional power-factor correction is needed.

The device (with an associated recorder) gives direct information on amount of corrective kilovolt-amperes needed and at same time records the power component, kilowatts. Both records are on the same chart.

Switching interval is one complete cycle per minute. This is set at factory for 35 per cent of time on vars and 65 per cent of time on watts. The time switch may be adjusted from 50 per cent of time on vars and 50 per cent on watts to nearly 0 per cent on vars and 100 per cent on watts. Instrument is available in two types: Portable; and for semi-flush switchboard mounting.
Steel 12/2/46; *Item No.* 9618

Spray Type Washer

Spray type washing machine for quick, thorough washing of parts on racks is announced by Optimus Equipment Co., 177 Church street, Matawan, N. J. It is designed to be placed directly on the floor. Top of unit is at working height, and all



connections are readily accessible. Lever-operated valve makes starting of spray easy. Spray nozzles are adjustable and replaceable.

Same machine can be used for submerged agitation to remove caked greases. It can be used individually, or in series where washing operation requires several steps.
Steel 12/2/46; *Item No.* 9818

Lock Wrench

Locking hand-wrench with a gripping strength equivalent to one ton pressure is now being manufactured by A. C. E. Inc., Transportation building, Detroit 26. Double lever or toggle action of this wrench permits it to be used as a combination straight, end or pipe wrench, vise, toggle press, clamp or pliers.

Parts up to any size which will fit maximum jaw opening of 1¼ in., can be held by the wrench for tooling, drilling, grinding or machining without slipping or changing position. It also can be used for welding, pattern making, removing bolts, cotter pins and wire bending or splicing. Made of alloy steel and cadmium plated, wrench is 10 in. long.
Steel 12/2/46; *Item No.* 9787

Motor Couplings

Small Morflex couplings, designed for low power takeoff of fractional-horsepower drives, are recent additions to line of power transmission equipment manufactured by Morse Chain Co., Detroit.

Offered in two new sizes, handling 3 and 9 ft-lb torques, couplings weigh approximately ½ and 1¼-lb, respectively. Maximum rpm is 3600 for both sizes. Choice of stock bores ranges from ¼-in. on the smaller to 1 in. on the larger.

Couplings use flexible Neoprene biscuit assembly which shields machine installations from shock and permits slight angular misalignment of shafts while transferring maximum power. They are unaffected by oil, dirt or weather, and require no lubrication.
Steel 12/2/46; *Item No.* 9793

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Longer Lived Abrasives

(*Continued from Page* 105)

new series of points—contributes materially to maintenance of sharpness in an abrasive already high in that characteristic.

Abrasive material must of necessity be hard, but so fracture as to result in sharp points for cutting. The impurities present in 32 Alundum crystals are fine films or stringers within the grains, giving improved fracture, as can be seen in Fig. 1. Other Alundum abrasives heretofore have been high in some cutting qualities and somewhat lower in others, but the new member of the group retains or improves desirable features while eliminating the weaknesses, if correctly specified as to grit, grade and bond.

Improved control in bonding abrasive wheels is also made possible because of rigid metallurgical and chemical control used in production of the new grains to form naturally shaped interlocking multifaced crystals with re-entrant angles, (See Fig. 3). The shape of the crystals permits the bond to hold the grain more securely in the wheels. The growing of pure crystals serves the dual purpose of absorbing all removable impurities which remain in the melt at time of crystallization and also serves to permit release of free crystals by chemical leaching.

This eliminates, as indicated, the necessity of crushing which would destroy the nubs or cutting points. Other kinds of abrasives must be crushed to produce commercial grit sizes.

Instability of matrix material is so great, a photomicrograph cannot be taken of the structure. In preparing the surface for photographing, matrix material is destroyed. Fig. 5 is a schematic picture of grains grown within the interlocking matrix. Films of the unstable compound surrounding the alumnia crystal are apparent. In the solidified ingot, after furnace process, the matrix, in which pure crystalline alpha alumnia grains are embedded, is a form of unstable sulphide glass, primarily calcium sulphide, iron sulphide and titanium sulphide.

The ingot is separated into large lumps. Exposed to water, the matrix material immediately begins to break up into calcium sulphide, which dissolves in the liquid, some hydrated alumina and the sulphides of iron and titania, very finely divided forming a sludge. In a large slaker, this process of hydrolysis or slaking is continuous. Water washes away sludge, freeing original crystals in pure form, eliminating crushing process.

Hydrated slush of matrix containing dissolved alkaline earth sulphides is fed through a continuous line of washers, classifiers and dryers. Pure alumina abrasive grains are separated from the impurity-containing slush ingredients in this equipment by a hydraulic process. Grains are fed to a dryer, then magnetically separated from any small particles of ferrosilicon which may remain in the matrix and which did not completely settle out in the original furnace process. The final operations consist of roasting and screening the grains into the commercial grit sizes.

The resulting abrasive consists of grains predominantly of the original nonfractured crystals as grown in cooling of the furnace melt. To an important degree this accounts for superior performance of this abrasive in grinding.

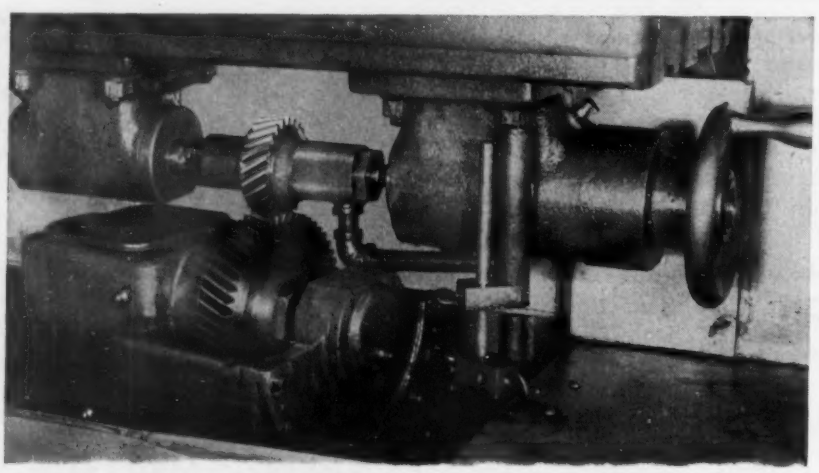
The furnace purification is a novel procedure and recapture of purified alumina from the ingot by chemical and hydraulic control is an entirely new process, automatic and continuous. Undecomposed alumina and matrix ingredient is continuously fed to the slaker, permitting uninterrupted production of finished grains. Making for strict uniformity in quality, variable inclusion of slag, glass, ferrosilicon and other impurities is eliminated. A typical dense abrasive grain made by the sulphide process is shown in Fig. 6.

Features of Stock Removal

Stock removal by grinding wheels of 32 Alundum abrasive in most classifications is outstanding; increased feed rate, no burning, cooler cutting, more resistence to dulling, less loading and dressing are improved features compared with other abrasives in this group. In tool room grinding, a greatly increased feed rate is attained on a 10-in. multitooth cutter, Fig. 7, with 18 inserted high speed steel teeth, ⅜ x 1⅝-in. The 38 Alundum wheel became dull on two revolutions of the cutter and burned at end of the second revolution; the 32 Alundum wheel went six revolutions, was still sharp, and there was no burning. Feed on both wheels was the same, also grit and grade.

Cooler cutting is a notable accomplishment. Less heat goes into work and cooler cutting has a direct bearing on power input; less wattage is required, 310 watts compared with 450 watts for 38 Alundum wheels, in some instances. Power in grinding is dissipated nearly 100 per cent and four ways through heat: Through the (1) wheel, (2) chip), (3) radiation and (4) work. Ordinarily, probably less than one-half of one per cent is dissipated by kinetic energy in the chip. That this is higher in case of wheels of the latest type is indicated by the heavy stream of chips, comparable to steady flame. Cooler cutting in the work and wheel is also an advantage in reducing any plasticity in steel or other metal. In tool room grinding the abrasive produces more chips with less plowing metal aside.

For surface grinding 32 Alundum



UNDERPASS CURVE-SHAVING GEARS: Operating on the principle of tangential rather than in-feed of cutter, this recently perfected gear finishing machine built by Michigan Tool Co., Detroit, combines underpass shaving and "curve shaving"—with a resulting large increase in production. One auto manufacturer raised production from 36 to 110 pieces per hour on an 8-pitch, 24-tooth cast iron timing gear with a 7/8-in. face. Stock removal was about 0.004 to 0.006-in. over pins. Cutter moves tangentially under the gear with axes of cutter and gear crossed. Cutting starts on both tooth faces as well as at one end of the teeth as cutter moves along the tangent line toward the gear. Cut sweeps across gear face as cutter moves past gear, then reverses and sweeps across the gear face to impart desired finish to gear teeth as cutter returns to its original position

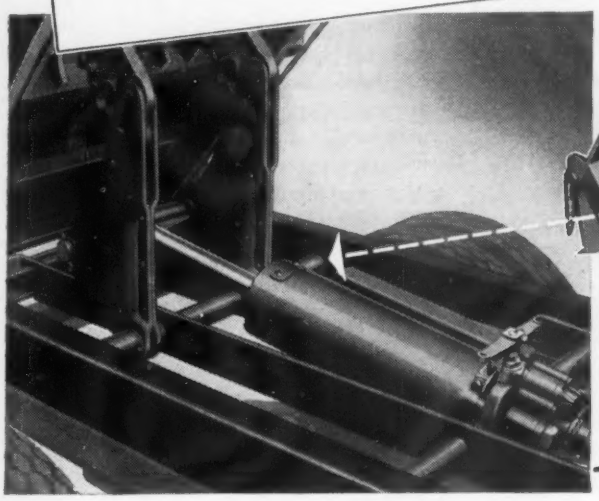
Problem ~~TROUBLE~~-SHOOTING *with* SEAMLESS STEEL TUBING

DUMP TRUCK INDUSTRY

The Problem: To provide solid support for hoist cylinder and arms, without increasing the weight of the assembly.

The Answer: OSTUCO Seamless Steel Tubing, light enough to meet design requirements, yet capable of withstanding the strains and loads to which it will be subjected.

Disposing of a Design Dilemma



PHOTOS COURTESY OF THE GALION ALLSTEEL BODY CO.

The heavy loads and severe stresses to which a dump truck hoist is constantly subjected calls for sound design and precise manufacture of hoist supports, through which the weight and stresses are distributed throughout the entire frame and chassis. OSTUCO Seamless Steel Tubing, inherently strong and lightweight, used in the hubs of the hoist supports, helped solve this difficult design problem.

OSTUCO tubing has helped solve design and production problems in a host of industries . . . it may well be the answer to *your* problem. OSTUCO'S experienced engineering, skilled craftsmanship* and on-time delivery record are available to manufacturers. Your copy of "M-1", a valuable booklet on steel analyses, tolerances and machining methods will be mailed on request.

**The OSTUCO tradition of quality manufacture is as old as the history of tube-making itself. Charles Sharkey, Bench Room Foreman and member of the OSTUCO 50-year Club, is one of many veterans who have spent a lifetime maintaining that tradition.*

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MANUFACTURERS OF SEAMLESS AND ELECTRIC-WELD STEEL TUBING

FLAME BENDING: Typical use of oxy-acetylene flame is in shaping irregular and complicated forms. Worker is shown bending a piece of 18-gage stainless steel into a spout for a centrifuge. Courtesy of Linde Air Products Co., New York

wheels show definite and considerable improvement over other members of the Alundum group, cutting freer, requiring less dressing and therefore lasting longer. Under equivalent operating conditions, however, a rougher surface is apparent because of the very sharp and free-cutting features of the grains. As most final finish in surface grinding operations is more a matter of machine technique than abrasive specifications, this is hardly a detriment. For grinding on the edge face of ring wheels, cylinders or segments, 32 Alundum is especially efficient because of freer and cooler cut, requiring less or no dressing. Segments surfacing cast iron plates were in use 15 days, compared with a maximum of three days previously, and grinding time was reduced about one-half with the new wheel. See Fig. 8.

This type of grinding usually entails an extremely wide contact area and sharpness in the abrasive is important; glazing or dulling in the slightest degree makes for overheating, burning and possible seizure. Grinding on the periphery of the wheel, conditions are not as severe, but the wheel face nevertheless must have high wear-resisting qualities.

With a commercial finish required on a surfacing operation of high carbon, high chromium steel dies, wheels of the new material proved superior, removing 0.002-0.003-in. per pass compared with 0.0005-in. that was previously considered good.

Rejections because of tapered holes are reduced in internal grinding with the new abrasive and rapid stock removal with a minimum generation of heat is an outstanding achievement in this classification. This is demonstrated by the rayon pump part in Fig. 9. Results are high in both wet and dry grinding on semiautomatic machines without automatic dressing. Manual dressing time is considerably reduced because of free cutting action and the fact the new abrasive stays sharp longer.

An internal grinding operation on collet steel required dressing of the standard wheel for each piece ground; with a 32 Alundum wheel, one dressing for every third piece is sufficient, increasing wheel life. In some cases dressing time has been reduced to one-fifth previously required. One quick pass of the diamond across the face is enough to resharpen, and removal of the entire top layer of abrasive is not necessary.

Free-cutting quality must be taken into consideration in specifying grit sizes and bond for internal as well as some other grinding operations. For internal grinding one grit size finer in the same grade is recommended, otherwise the heavier stock removal leaves grain marks on some work surfaces. The production of pieces per wheel is often more than doubled. Low wheel wear permits retention of accuracy in size and shape and reduces rejections for tapered holes.

Visible difference in the spark produced in noticeable; rate of infeed has increased and therefore the spark stream, but work does not become excessively hot. Small parts, formerly too hot to handle after grinding, are removed with unprotected hands. Although stock removal is greater, less heat is generated or a more rapid dissipation of heat is apparent.

Hemming cylinders of the new abrasive are giving improved performance in the cutlery industry, a field in which shellac wheels are prominent. Hemming is done by a single purpose automatic machine and involves grinding to varied thickness, such as knife blades graduated to sharp edges and points, involving removal of considerable stock with good finish and no burning. In a vitrified open structure cylinder, 32 Alundum abrasive has increased cylinder life three to four times, giving satisfactory finish without burning and reducing polishing operations in some instances. Cylinders one grade harder than commonly used in either resinoid or vitrified bond and finer grit sizes generally are specified. Power output required for this grinding operation is considerably lower as in most others. Tests are now being made on stainless steels.

With application of the new wheels for light grinding and precision jobs, improvement was expected, but the degree of improvement in some types of heavy grinding has been surprisingly high, as in snagging. Ability to penetrate, to resist dulling and to remain sharper longer, in most operations has been beyond expectations. In snagging, these sharper wheels cut faster than regular or 57 Alundum abrasive, which is the reason for their application in this field.

Sharper Abrasive Cuts Faster

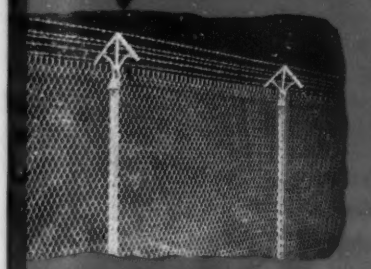
On offhand grinding of forgings, tools and steel castings, with both vitrified and resinoid wheels on welds, steel castings and billets, the sharper abrasive cuts faster with the limited pressure available. Because sharper grains penetrate work with greater ease, more bond to hold them in place until worn down is required; wheels one to three grades harder than formerly used are favored in resinoid specifications.

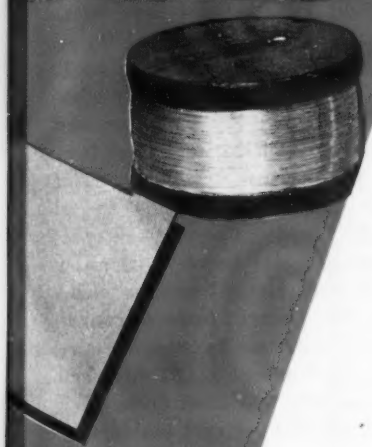
Tests show 32 Alundum crankshaft wheels eliminate the burn from side-wall grinding. In general the abrasive shows to better advantage in crankshaft wheels with A type bond than BE bond. With this bond, wheels hold up well at corners, eliminating side wall burning while producing eight cranks per dressing compared with four with regular Alundum wheels. This wheel also produced over 100 cranks more than some standard wheels.

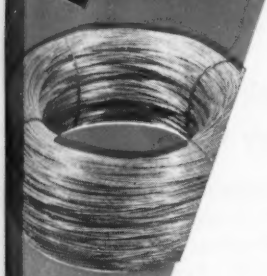
One or two grades harder than Alundum abrasive wheels now used are recommended for centerless grinding. Exceptionally cool cutting action is being achieved in centerless grinding with high stock removal, but with slightly rougher finish when compared grit for grit. One or two grades harder for roll grinding wheels and cylindrical grinding is also recommended.

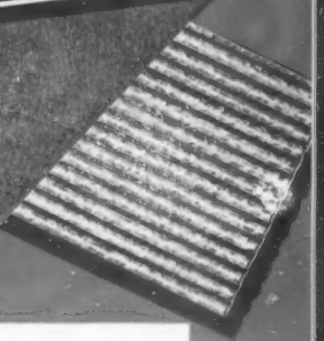
When properly specified, the new abrasive will have a definite place in cam grinding. Used on steel camshafts, a

Tops FOR THINGS MADE OF STEEL









Manufacturers are looking more and more to Continental for steel sheets, manufacturer's wire and many other special steel products. Continental Chain Link fence is made of KONIK steel to provide low cost property protection through longer life. Steel sheets and roofing in a wide variety of bases and coatings are made to meet the specific needs of their application. Continental manufacturer's wire is supplied as small as a thread or as large as a bar, in standard and special shapes and in many different finishes and coatings. Nails, staples, and many other steel products round out the Continental line and make it really "Tops" in steel. All Continental products are made from open hearth steel and are uniformly processed and finished according to the needs of their use. Write for your copy of the Manufacturer's Folder today.

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PRODUCERS OF STEEL SHEETS, including Continental GALVANIZED, COPPER-STEEL Galvanized, KONIK steel sheets Galvanized, UNIFORM SPANGLE Galvanized, DULL COAT, Continental GALVANNEALED, ELECTRICAL, Hot Rolled Pickled, and many styles of Formed Roofing. ALSO, Manufacturer's Wire in many sizes, shapes, tempers, and finishes, Continental Chain Link Fence, Nails, and other steel products.

32 Alundum wheel wore but 0.001-in. grinding 13 cams, with 0.030-in. stock removal compared with 0.005-in. wear with a former wheel. On finish grinding, cams ground with the new sharper wheels are 0.0005 to 0.0006-in. leaner on ramps. Finish was smooth with no signs of tearing.

In appearance 32 Alundum differs from other abrasives. Wheel colors vary from medium gray in coarse grit sizes to off-white in fine, and there is also color variation from warm to cool between soft and hard grades of the same grit size. Wheels are available in grit sizes from 16/1 to and including 100/1 and incidentally production sizes of the crystals follow closely normal demand for grain sizes.

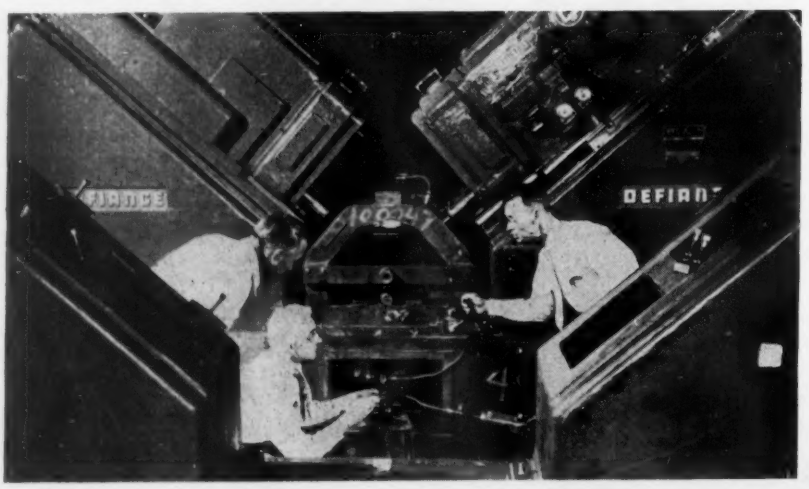
Available grades of hardness and structure numbers are the same as for 38 Alundum abrasive in BE vitrified bond and the same as for regular or 57 Alundum abrasive in all resinoid bonds. Although resinoid bonds are available for special purpose operations, most toolroom wheels will be in BE vitrified bond.

The struggle for purity in aluminous abrasives is unending. Since wheels were made of natural emery and corundum, bonded with pottery clay, research has been continuous for a substantially pure alpha alumina in the form of continuous crystals without impurities, striving for the maximum of usable abrasive. In this, Norton Co. has been well to the front.

When the company acquired in 1901 the rights to make by an electric furnace manufacturing process a corundum-like abrasive by the fusion and chemical purification of bauxite, an important step was taken. This chalky mineral, bauxite, contained as impurities, TiO_2, SiO_2 and large amounts of Fe_2O_3, in addition to about 80 per cent alumina in the amorphous form. Later in a special electric furnace invented by Aldus C. Higgins of Norton Co., a mixture of calcined bauxite, metallurgical coke, and iron borings, the natural clay-like ore was melted and converted into crystalline alumina with desirable abrasive properties, while some of the impurities were reduced into a ferrosilicon metal layer which separated out of the fused bath and gave, after cooling, a solid ingot of crystalline alumina. This was the first or "regular" Alundum. This process could be controlled to the point where the eventual product contained 95 per cent fused alumina and the residual impurities consisted largely of TiO_2 and SiO_2, the TiO_2 being predominant.

For more than 10 years this process was the only source of crude abrasive which was used in the manufacture of Alundum type grinding wheels which became an important tool of industry. Many worked with this process, altering degree of purification and type of residual impurities left in the abrasive to produce various desirable effects in the grinding wheels made from the abrasive. These changes were not fundamental and represented but an intensification of the basic objective which was to produce a uniform concentration of abrasive alpha alumina. Use of the controlled electric furnace process to manufacture the essential ingredient resulted in a constancy of quality and performance which was not available in the natural abrasives.

Another outstanding step in the aluminous abrasive field development of 38 Alundum is the purification accomplished prior to the fusion by a chemical processing of the same bauxite ore which was used in the making of the first manufactured abrasive. By using a chemically purified alumina as a raw material for furnace fusion, a crystalline product was made in which the alpha alumina comprised about 93 per cent and beta alumina about 6 per cent of the abrasive. This alumina was unaltered by the presence of any TiO_2 or the abrasive. This alumina was unalfication of bauxite. But high purity abrasive is characterized by a porous and brittle structure which causes it to fracture and break down in service. This led to its application in many special light grinding fields. Cause of this special characteristic was found to be associated with the chemical process which preceded the electric furnace conversion of the alumina ore to crude abrasive. With the development of 32 Alundum, another long step has been taken along the path for a 100 per cent usable abrasive.



MACHINING VALVE HOLES: This series of eight machines mounted in pairs on columns with proper machining angle handles production machining of valve holes and inserts in the manufacture of V-type motors. Locating pins and clamping arrangements are hydraulically operated so that pins locate the cylinder block before clamping action takes place. Manufactured by Defiance Machine Works Inc., Defiance, O., these hydraulic units are electrically interlocked so that operator cannot start the cycle unless hydraulic unit for fixture is running

Eastman Develops New Industrial Copy Paper

Three new industrial photographic papers said to speed production of paper positives from engineering drawings are being manufactured by Eastman Kodak Co., Rochester, N. Y. Known as Reflex copy TXA, Linagraph Ortho TXA, and Linagraph blue sensitive TXA, these papers are translucent, extra light weight and are said to have a high wet and dry strength.

The company also states that these papers may be used in place of film negatives where rapid printing time in making subsequent positives is necessary.

—o—

Faster starting of fluorescent lamps by application of new water-repellent material is accomplished on a certain type fluorescent lamp made by General Electric at Hoboken, N. J. The new silicone material, called Dri-film, forms an invisible and permanent "raincoat" over the lamp end. When used with metal adjacent to the lamp, film makes metal practically insensitive to high humidity. It enables lamps to operate satisfactorily even under 100 per cent relative humidity.

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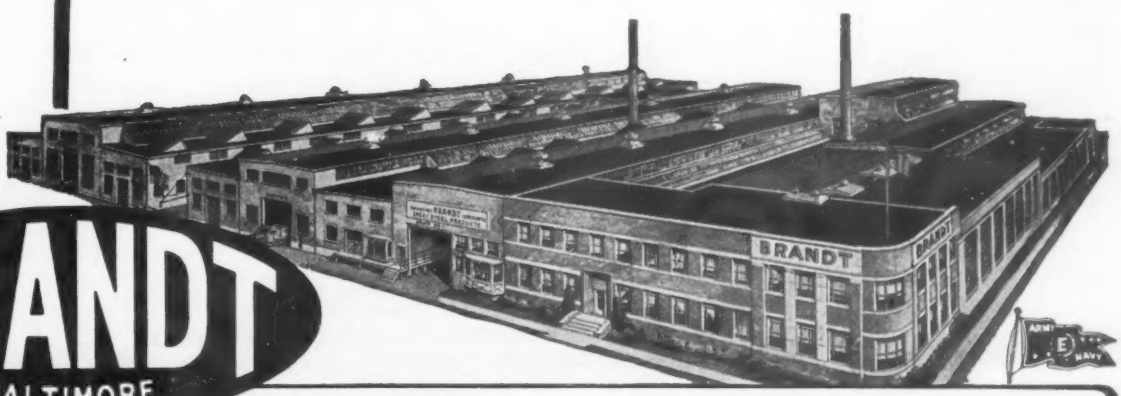

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Oxygen in Open Hearth

(*Continued from Page* 108)

oil-air flame, by broadening the flame front with flattened and tapered nozzles and by varying the oil-stream pressure, temperature and mixing ratio. The use of oxygen to control the character of the flame developed by the combustion of solid, liquid and gaseous fuels offers interesting possibilities for speeding up open-hearth operations. Oxygen can be used in relatively high concentrations to establish a zone of intense combustion within or on the periphery of the fuel stream, generating primary combustion products such as carbon monoxide and hydrogen at high temperatures which then react rapidly with the secondary air-oxygen in the furnace atmosphere. The intense primary combustion taking place in or on the surface of the fuel makes it possible to burn within a given furnace working space, considerably larger volumes of fuel than were formerly used. In addition it becomes possible to control the shape of the resulting secondary flame as well as its length and point of maximum heat release, by varying the velocity and direction of the oxygen stream, as well as the oxygen-air ration. The definition of this type of flame is such that it can be directed at the charge so effectively that rapid heating of the charge occurs, while the furnace refractories remain substantially out of contact with the high temperature flame and are not affected by it.

Control of Flame: It has been found in actual practice that the use of oxygen for the primary combustion of fuel, in the firing of large open-hearth furnaces, makes it possible to control the flame characteristic as required by the condition of the charge, thereby giving the furnace operator a means of regulating both the heat input to the furnace and the distribution of the heat release in the furnace. Much experimental work remains to be done, in adapting the principle of the oxygen "conditioned" flame to the operation of an open-hearth furnace. It is more than probable, that each shop will have to suit the method of application to the prevailing conditions of scrap-hot metal ratio, all cold charge, present furnace and regenerator volume, quality of scrap and pig iron, and the other variables which affect open-hearth practice. The work which has been done to date, however, indicates that the outputs of many open-hearth plants can be increased from 20 to 40 per cent, with little change in present furnace design.

Application of Oxygen Conditioned Flame: The first practical large scale demonstration of the oxygen conditioned oil flame was made in the spring of 1946 at the Hamilton plant of the Steel Co. of Canada, Hamilton, Ont. Since that time, a number of steel companies have experimented with this new process both on small cold charge furnaces and on large furnaces using relatively high percentages of hot metal. While the final answer has not yet been given, concerning the extent of the savings that can be affected by the use of oxygen conditioned fuel combustions, some preliminary conclusions can be drawn at this time, and some experiences with the application of this process cited.

In a typical 200-ton furnace, operating on a 50-50 scrap hot metal ratio, some 400 gph oil are normally burned during the charge and meltdown period which will require 8 to 9 hours in a heat cycle of 10 to 11 hours. Particularly where light and bulky scrap is being charged, interruptions in charging are frequent to permit the scrap to flatten out and to make room for further scrap charge. The prolonged charging time, with the charging doors open, results in an extended period, during which the furnace is operating under conditions not favorable for rapid heating.

Typical oil flame which develops in normal air combustion is shown in Fig. 1. The atomized oil particles burn slowly with the air to form a voluminous flame of low velocity which develops its maximum temperature near the outgoing end of the furnace. This flame is readily deflected by the scrap charge, and lacks the necessary calorific intensity to rapidly clear away such obstructions.

By surrounding the oil stream, with a rapidly moving annular stream of relatively high purity oxygen, a concentrated harsh flame of high flame speed and temperature and of high calorific intensity is developed. This flame rapidly cuts a swath through any scrap obstructions, so that proper combustion can be maintained at all times. Moreover, by varying the ratio of oxygen to oil used, the flame can be increased or decreased in length, and the heat release front the flame directed on the charge as desired. Fig. 4 shows such a flame developing from a typical oxygen-oil burner.

When operating with the oxygen conditioned oil flame, a fuel rate of 600 gph or more of oil, with some 1000 cfm of oxygen are used. The charge and meltdown period is shortened from 1 to 3 hours, with a total consumption of from 150,000 to 200,000 cu ft of oxygen. The oxygen addition is started with the charging and is continued until the oil rate is reduced, with the bath melted flat and the furnace at working temperature. This occurs generally from 1 to 2 hours after the hot metal addition. The period during which oxygen is used varies with the scrap-hot metal ratio, and with the resulting amount of scrap to be charged and heated. For 50-50 scrap-hot metal additions in large furnaces with adequate charging facilities the period of the oxygen addition is from 3 to 4 hours.

Various designs of burners, incorporating the idea of surrounding the oil stream with a fast moving stream of oxygen have been used, the basic principle involved being illustrated in Fig 2. The fuel pipe is inserted into a cooler, and

NO SHIPPING PROBLEMS: Liquid carbon dioxide, in refrigerated pressurized form is pumped directly from producer to consumer's storage tanks in this insulated pipe line running to Walter Kidde & Co. Inc., from Liquid Carbonic Corporation's new plant at Belleville, N. J. Normally gaseous carbon dioxide was previously delivered by truck or rail in the form of dry ice, or as a gas in pressure tanks. Pipe line, over a quarter of a mile long, is of standard 2-in. steel with welded joints, insulated with asphalt paint and two layers of tar paper

supported centrally by suitable spiders. Oxygen is passed through the annular space between the oil pipe and the outer cooler. Both bare and steam jacketed oil pipes have been used, and the dimension of the annular space has been varied from a width of ¾ to 2½. The narrower width of annular opening yields a higher oxygen velocity in relation to the oil velocity and appears to result in a more precisely formed and higher velocity flame than when a larger passage is used. Since the action of the oxygen conditioned flame depends on the intense reaction between the fuel and relatively high purity oxygen, it is desirable to use as much of the oxygen as possible in the primary combustion and before it has been diluted by the normal air from the regenerator.

Ratio of Oxygen to Fuel: The ratio of oxygen to oil has been varied over wide limits and the anticipated changes in flame form have been confirmed. Using a fuel rate of 600 gph of oil, on a furnace with a normal maximum oil rate of 400 gph and requiring atmospheric air at the rate of 11,000 cfm, some 1000 cfm of oxygen is required if the additional 200 gph of oil are to be burned with oxygen. Some one-third of the total oxygen entering the furnace is thus introduced as oxygen, the remaining two-thirds being the oxygen from the combustion air. The degree of oxygen conditioning required will depend on many factors, including the furnace dimensions, the nature of the scrap and the method of charging, and appears to be a subject for investigation in each particular application.

Some study has been made of the effect on the flame shape, of varying the extent of oxygen conditioning for various fuel oil rates. As was anticipated, the length of the flame is shortened as the ratio of oxygen to the burner compared with the normal furnace air is increased, and the flame can be made to develop its maximum intensity at any point from the entering to the leaving end of the furnace. Fig. 3 shows diagrammatically, the shape of the flames developed with air-oil and with various degrees of oxygen conditioning.

In operating the oxygen conditioned oil flame, it is customary to maintain a constant ratio of oxygen to air, adjusting both the oxygen and air to correspond to variations in the fuel rate. This procedure avoids the introduction of too many variables into the combustion problem. However, where special conditions arise, such as scrap accumulations in front of the burners, the flame can be shortened by increasing the oxygen-air ratio, or where melting is slow toward the center of the furnace, the flame can be correspondingly lengthened by reducing the oxygen-air ratio.

The angle of impingement of the flame on the charge also has been studied. There is a tendency of the flame to rapidly cut a swath through the scrap, leaving unmelted scrap directly underneath the burners. Increasing the burner angle with adjustable burners has been found to be helpful in clearing scrap from the furnace ends. This also can be accomplished by suitable variations in the charging procedure.

Volume of Waste Gases: When burning 600 gph of oil with 1000 cfm of oxygen and with sufficient air to give a 10 per cent excess of air plus oxygen (2 per cent in the flue gas), there is an increase of only 13 per cent in waste gas volume, as compared with a 50 per cent increase in fuel rate over a former fuel rate of 400 gph of oil. The possibility of increasing the heat release in the laboratory of the furnace, in cases where restrictions in the air supply, or insufficient draft, limit the ability of the furnace to burn fuel is obvious. This condition applies in many furnace plants where the furnace capacity has in some instances been doubled, without a corresponding increase in air and waste gas passages or in regenerator volume. Fig. 5 contains a plot of the Btu of heat available from the combustion of a fuel with theoretical air and with various oxygen fuel ratios.

Effect of oxygen additions in increasing the heat release per unit of combustion air through the regenerators, or per unit of flue gas leaving the furnace is considerable. In the previously discussed condition of firing, where 1000 cu ft of oxygen are used with 11,000 cu ft of air, corresponding to an oxygen-air ratio of 0.091, the heat release per unit of flue gas leaving the furnace is increased some 30 per cent and the heat release per unit of combustion air is increased 43 per cent over normal air practice. Use of oxygen for conditioning fuels appears to be particularly advantageous where the fuel burning capacity of the furnace is limited by deficiency of air supply or of waste gas removal.

Refractory Life: Effect on the furnace refractories so far noted has been an increased erosion of the outgoing ends of the furnace, and a more rapid fouling of the checkers. On furnaces with adequate gas passages, the waste gas velocities can be maintained at sufficiently low levels to avoid such effects. In the furnace itself, the possibility of "nipping" the roof is always present as in any fast working furnace, and requires the usual close attention by the operating personnel, to be sure that the flame is developing properly and is not playing directly on the furnace structure. The use of basic refractories, in the furnace ends and roof, is a development which would be of advantage when using the oxygen-oil flame, but it does not appear to be essential to any greater degree than in the normal operation of a sharp working furnace.

Fuel Consumption: The amount of fuel consumed per ton of steel, when

NEW LITERATURE

CATALOG FOR TOOL & DIE MAKERS & MACHINE SHOPS
By Die Supply Co., 5345 St. Clair avenue, Cleveland 14. Die-Co Accessories No. 4, lists sizes and data pertaining to load and deflection.

TOURNACRANE
By R. G. LeTourneau Inc., Peoria, Ill. A 6-page colored folder, No. C-633 describes on or off-the-road uses of crane.

ELECTRICAL INDICATING INSTRUMENTS
By Marion Electrical Instrument Co., Manchester, N. H. A 28-page illustrated book describing line of instruments.

PUNCHES AND OTHER TOOLS
By George F. Marchant Co., 1420-34 South Rockwell street, Chicago 8. Catalog No. 46.

MULTRONIC CAPACITROL
By Wheelco Instruments Co., 847 West Harrison street, Chicago 7. Bulletin D4-2 lists applications and describes operation of instrument.

CENTRIFUGAL AND STATIC CASTINGS OF PLAIN OR ALLOYED IRONS
By Shenango-Penn Mold Co., Dover, O. Bulletin includes data on latitude and advantages of centrifugal process, typical centrifugally cast products, field service, machining facilities and chart on specifications and characteristics.

PLASTICS SEALING CAPS & SLEEVES
By General Electric Co., Plastics Division, Pittsfield, Mass. A 4-page illustrated folder describing applications, sizes, etc.

FIREYE FLAME FAILURE SAFEGUARD
By Combustion Control Corp., 77 Broadway, Cambridge 42, Mass. Bulletin No. 102-C describing equipment.

PACKING AND SHIPPING METHODS
By Acme Steel Co., 2840 Archer Avenue, Chicago 8. No. 17 of Process News contains stories on shipping of aluminum pigs, blood plasma, steel drums, pails, rocket motors and others.

HOBBING AND DIE SINKING
By Watson-Stillman Co., Roselle, N. J. An 8-page illustrated bulletin giving details and specifications of hydraulic hobbing and die sinking presses.

PUSHER TYPE FURNACES
By W. S. Rockwell Co., 210 Eliot street, Fairfield, Conn. Bulletin No. 423 illustrates and discusses various designs of this type furnace.

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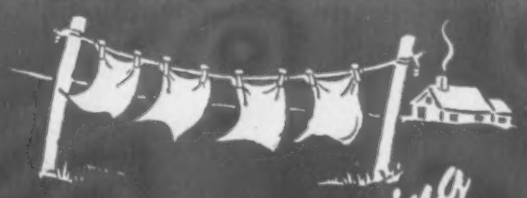

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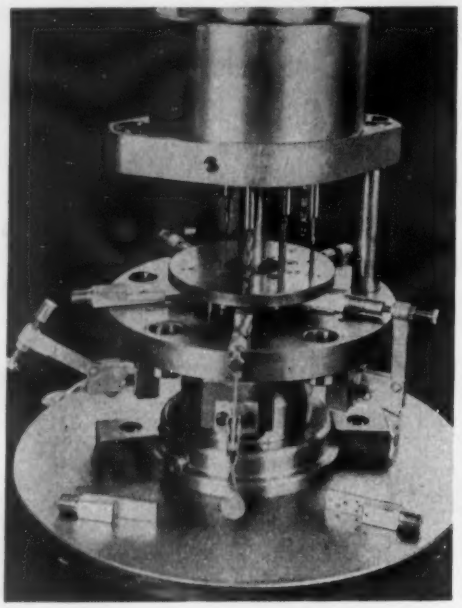

GEARLESS DRILL HEAD: By combining this 7-spindle gearless drill head and a 1-in. index fixture, developed by Zagar Tool Inc., Cleveland, seven various size holes, ranging from No. 48 to 5/32-in. are drilled in one cycle into a socket part. First position is used for loading and unloading. From here part is indexed to second position where one hole is drilled, while another part is loaded. Indexed to third position, part is pierced by two more drills, while one hole is drilled in the second part loaded. Cycle continues until four parts are being drilled simultaneously, while a new one is loaded

using oxygen, has been reduced despite the increased rate of firing during the charge and meltdown period. This apparent anomaly is readily explainable when it is considered that the heat transfer from the oxygen-oil flame is largely directed to the scrap. As a result the furnace lining is not raised to higher temperatures (2600-2800° F) than are normal for the scrap melting period without oxygen. The radiation and cooling water losses remain substantially constant, while the amount of heat liberated in the furnace and efficiently transferred to the charge is considerably increased. A typical hot metal heat, during which the oil rate is increased 50 per cent for one-third of the cycle, and which has a charge to tap time 20 per cent less than normal, will show an average fuel saving per ton of 8 per cent. Studies are being made of the oxygen-oil flame temperature, of the rate of heat transfer to the charge and of the overall heating efficiency of the furnace during the period of oxygen use which will furnish the necessary data for a more detailed comparison of the fuel consumption when using the oxygen conditioned oil flame with that normally obtaining for the air-oil flame.

Oxygen Purity: Some work has been done to determine the effect of the oxygen purity on the characteristics of the oxygen oil flame. This phase of the investigation is of particular importance when considering the practical large scale application of the process. In experimental work to date, standard commercial grade oxygen with a purity of 99.5 per cent has been used, mainly because oxygen of this purity is most readily available in substantial quantities. Since the use of such oxygen at present cost of manufacture, could be economically justified only under extremely unusual circumstances, and since the large scale manufacture of lower purity oxygen at a fraction of the present cost is becoming a reality, the importance of determining the effect of oxygen purity on the flame efficiency is obvious. Mixtures of air and oxygen varying in oxygen content from 50 to 99.5 per cent have been used. It has been found that substantial quantities of nitrogen can be present in the oxygen stream without seriously affecting the flame characteristic of the oxygen-oil flame. While quantitative data on the effect of oxygen purity on flame efficiency are still being obtained, it can be stated qualitatively that the oxygen purity of some 90 per cent, projected for the large scale production of tonnage oxygen will be suitable for this use.

Such a result would be anticipated from theoretical considerations of the oxygen oil flame. Since oxy-fuel combustions result in flame temperatures at which the normal combustion products, carbon dioxide and water vapor, are largely dissociated into carbon monoxide and hydrogen, oxygen combustions are necessarily incomplete. The degree of incompleteness increases with increasing oxygen purity, so that a plot of flame temperature versus oxygen purity has the form of a parabolic curve, approaching the maximum flame temperature asymptotically. The rate of increase in flame temperature is rapid with increasing oxygen purity in the lower purity ranges, and fall off in the higher purity ranges, where dissociation of the combustion products, carbon dioxide and water vapor, becomes increasingly complete.

Economies of the Use of Oxygen: Use of oxygen in open-hearth combustions, could hardly be justified by the apparent fuel savings or by the small increases in yield, which appear to result from the faster melting and lower oxidation of the scrap. The deciding factor is the increase in production rate obtainable, and the relative importance of such an increase to a particular operation. Disregarding any consideration of what could be accomplished by radical changes, in furnace design, such as the much discussed 1-way furnace without regenerators, or by the use of higher temperature refractories which would affect the finishing period of the heat, the application of the oxygen conditioned oil flame will be favored by a furnace operation where the air supply and preheat are not adequate for the furnace capacity.

The small all cold charge furnaces, typical of steel foundry practice, and steel plant furnaces using high scrap-hot metal ratios, or furnaces which have been increased in size and capacity without a corresponding enlarging of the regenerative system, offer possibilities of higher percentage increases in the rate of production by the use of oxygen than fast working furnace operating with a low scrap-hot metal ratio. Speed of charging is a factor, which must always be taken into consideration, since fast melting pre-supposes fast charging and adequate scrap preparation and transfer facilities.

The value of an hour of open-hearth time, which is the most important item to be balanced against the cost of the oxygen used varies widely from plant to plant, depending on the percentage of steelmaking capacity being used, the balance between steelmaking and rolling mill capacity, and on the method of cost accounting.

Operating at full production, and where steelmaking capacity is at a premium, a considerably higher emphasis will be placed on the rate of production than when furnaces are idle for lack of orders. The final answer to the question of the value of the use of oxygen for reducing the charge and meltdown period can only be obtained from a complete analysis of all factors affecting the cost of a particular operation in a particular plant. However, experience to date indicates that a substantial reduction in the charge and meltdown period of the heat can be effected by the use of oxygen conditioning of the fuel, to increase the rate and the efficiency of heating the cold charge.

REFERENCES

(1) Use of Oxygen in the Open Hearth; G. Bulle; *Stahl und Eisen* (60) pp 201-206; 1940.

(2) Use of Oxygen in the Open-Hearth Process; K. G. Trubin; Kislorod; 1944, No. 3, pp 16-20.

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Prepared Atmospheres

(*Continued from Page* 113)

hydrogen has no decarburizing effect on high carbon steel except at elevated temperatures where it reacts with the carbon to form methane ($Fe_3C + 2H_2 \rightarrow 3Fe + CH_4$). Since methane is a reaction product, the effects of hydrogen on the steel surface may be offset or counterbalanced by mixing it with certain portions of methane.

Water Vapor is oxidizing to ferrite ($Fe + H_2O \rightarrow FeO + H_2$), and combines with carbon in steel to form carbon monoxide and hydrogen ($Fe_3C + H_2O \rightarrow 3Fe + CO + H_2$). It is reactive to a steel surface at very low temperatures and is the principal cause of bluing during the cooling cycle.

Hydrocarbons are carburizing gases. They are subject to thermal decomposition at annealing temperatures, liberating hydrogen, depositing soot and if they contain more than a single carbon atom they tend to form at the same time higher unsaturated hydrocarbons.

Carbon Dioxide plus Hydrogen react at normal heat treating furnace temperatures to form water vapor and carbon monoxide ($CO_2 + H_2 \rightarrow CO + H_2O$). No matter how low the dew point of a prepared atmosphere, therefore, if these two gases are present the furnace charge is subject to its normal decarburizing and scaling actions from water vapor.

Flue Gas in Open Fired Furnaces deserves attention. In the oxidizing atmospheres met with in normal heating practice the rate of scaling and the rate of decarburization about keep up with each other. Hence, little effect is noticed on the finished steel. However, when heating is performed in a reducing atmosphere, the rate of scaling is reduced and decarburization becomes an important factor. When heating for hot working or forging the overheating or "burning" temperature is at its maximum when oxygen is eliminated and the furnace is run reducing.

Sulphurous Gases are detrimental to low carbon and nickel-bearing steels; these scale to a greater degree in furnace atmospheres containing even small amounts of sulphur. This effect increases with increasing temperature. Sulphur likewise has a harmful effect on the surface of nickel-bearing steels similar to "burning".

Lithium Vapor has such an enormous affinity for oxygen it will dissociate water vapor in the furnace atmosphere to form harmless lithium oxide and hydrogen ($2Li + H_2O \rightarrow Li_2O + H_2$). It likewise combines with any free oxygen present ($4Li + O_2 \rightarrow 2Li_2O$). The lithium then transfers much of the oxygen it has picked

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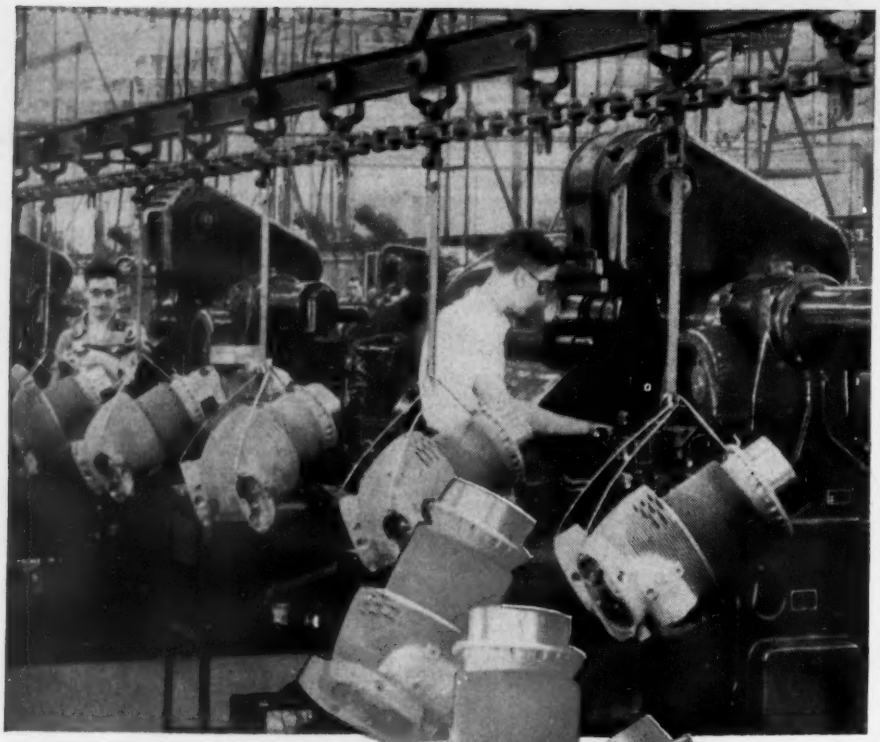

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up to the carbon monoxide in the atmosphere thus releasing some lithium to pick up more oxygen ($2Li_2O + CO \rightarrow Li_2CO_3 + 2Li$ and $Li_2CO_3 \rightarrow Li_2C + CO_2$) thereby substantially reducing the lithium consumption.

Standardization of Motors

(*Concluded from Page* 120)

system. Therefore, the same frame numbers with proper suffix letters (when assigned) would be used for vertical and flange motors as are designated for the horizontal motors of corresponding sizes.

Individual manufacturers may use any letter preceding the frame number, but such a letter would have no reference to standardized dimensions. For example, a number 66 frame might be designated as "66" by one manufacturer and as "A66" by another manufacturer, but the D, BA, E, F and H dimensions of both frames will be identical and will be the values shown in accompanying diagram.

Company To Exhibit Electronic Instruments

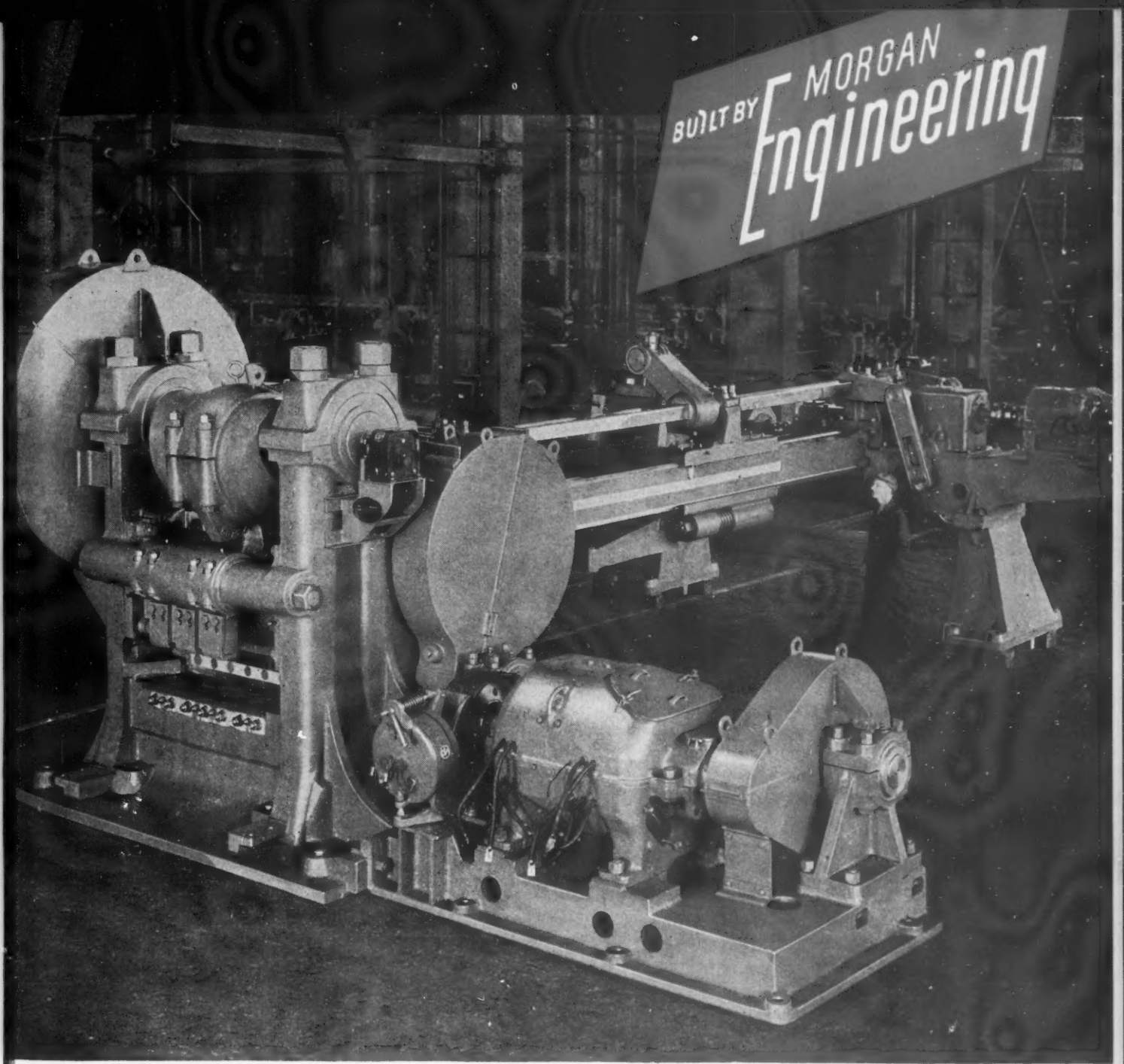
Featuring continuous analysis, chart records and rapid response to changes, the electronic oxygen recorder is suitable for boiler and industrial furnaces, kilns and process control, according to its maker, Bailey Meter Co., Cleveland. This instrument, along with an area meter which, when installed in a water system, shows sensitivity to small flows and response to changes in flows, will be in the company's exhibit at Exposition of Power and Mechanical Engineering in New York, Dec. 2 to 7.

Other electronic equipment, such as a resistance thermometer, a potentiometer pyrometer, telemeter transmitter and receiver and a bellows type electronic transmitter will be shown, as well as cut away models of a fluid and a boiler meter.

Exhibited Controller Has Magazine Chart Feed

Record-controllers loaded with a pad of 100 charts and arranged so that when the used chart is removed, a fresh chart is automatically brought in the correct position are to be exhibited by Penn Industrial Instrument Corp., Philadelphia, at Exposition of Power and Mechanical Engineering in New York, Dec. 2 to 7.

Previewed at the show will be a mechanical meter suitable for a working pressure of 2500 psi. Termed the Hays-Penn, it is said to avoid stuffing box friction and maintenance by a magnetic clutch design which, with a large float, produces sufficient power to simultaneously operate two pens.



MORGAN 450-TON BLOOM AND SLAB SHEAR

● Among the many types of mill equipment built by Morgan, is the 450-Ton Bloom Shear illustrated above for shearing 12″ x 12″ blooms and equivalent slab sections. Shear is designed without flywheel or clutch for start and stop operation. Hold-down gag is of the independent hand adjusted type. A motor operated gauge is provided for gauging lengths from 2′0″ to 15′0″. Of massive construction, this shear is typical of the types of mill equipment Morgan designs and builds.

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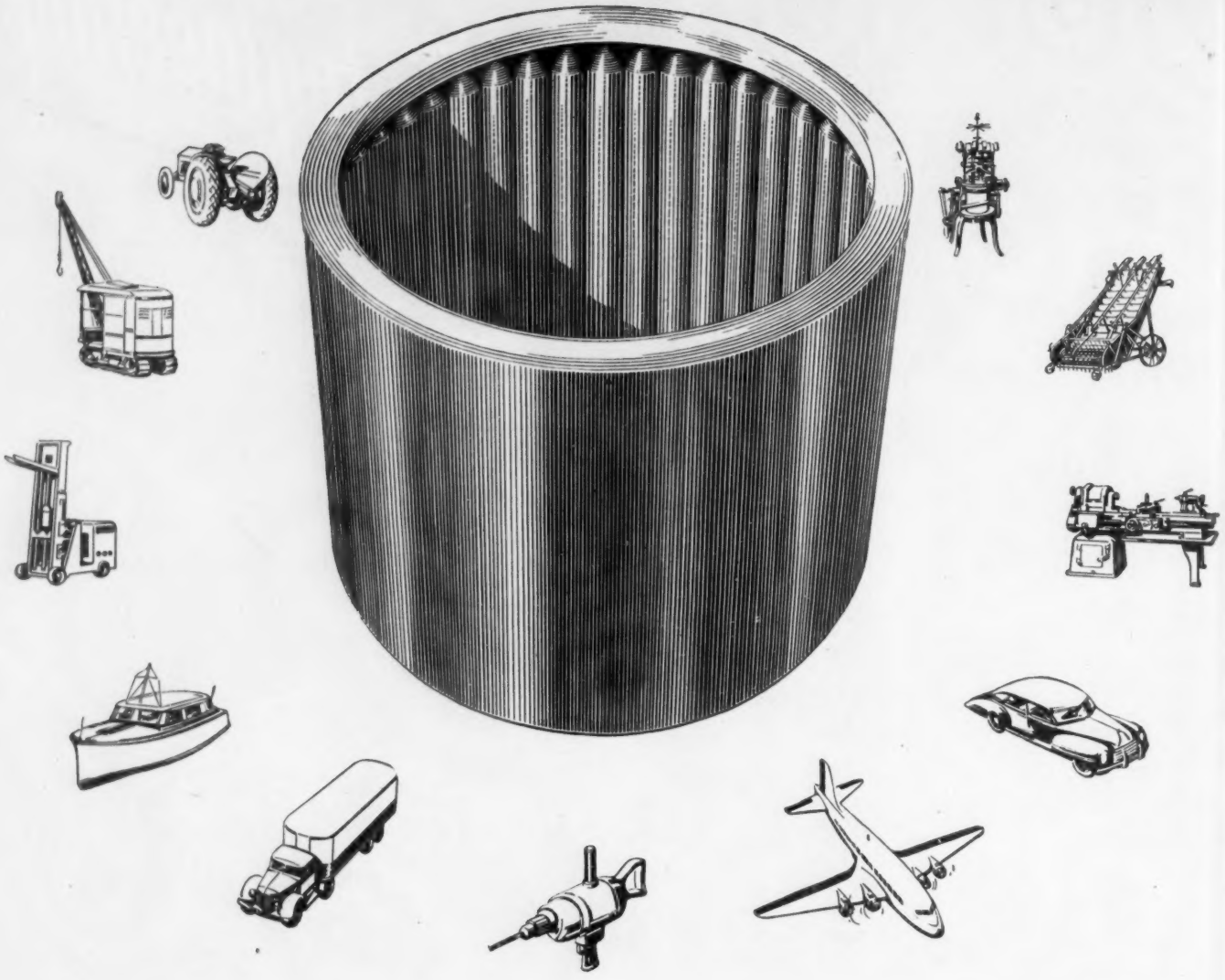

It has an ever widening circle of application

In virtually every type of mechanical equipment, Torrington Needle Bearings are serving in an increasingly varied range of applications . . . whatever the load and speed requirements.

The reason lies both in their tremendous radial capacity—greater in relation to O.D. than in any comparable bearing—and in their low coefficient of starting and running friction —with no practical speed limitation on their application. Behind these advantages lies the principle of Needle Bearing design—a full complement of small diameter precision rollers which provide maximum area of bearing contact surface.

Then too, many other important Needle Bearing features—compact size, unit construction for easy installation, efficiency of lubrication and low initial cost—widen the scope of their application to modern machines.

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THE TORRINGTON COMPANY

TORRINGTON, CONN. SOUTH BEND 21, IND.

Offices in All Principal Cities

TORRINGTON NEEDLE BEARINGS

Powder Metallurgy

(*Continued from Page* 132)

are said to have been obtained with carbide tool holders in the precision boring of long holes. Carbide boring bars actually bored holes which had a ratio of over 7 to 1 (length to diameter of bar). Despite great length as compared with diameter, they performed satisfactorily, permitting the tool to produce straight, round, and concentric holes to a tolerance of 0.0002-in.

Strength: Carbide powder metals have a tensile strength in excess of that required for most normal operations. In addition, carbides have great compressive strength. Advantage is being taken of this property by using large balls of solid carbide to support heavy, moving tables on large planers and grinders. These balls not only carry heavy loads but are exposed to abrasive conditions caused by the pressure of metal dust and chips as well as the abrasive dust produced by grinding operations.

Surface Finish: Despite the fact that the internal structure of metal carbides is that of a typical powder metal, parts made of this material are capable of being ground and lapped to a surface smoothness of ½ mu in. (1/80,000-in.). In fact, this degree of finish is currently being given to mandrel nibs used for tube drawing. An even higher degree of finish can be produced, as in making master gage blocks.

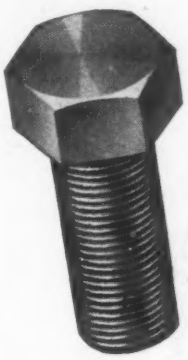
Wear Resistance: An idea of extreme degree of resistance possessed by these powder metal products to wear caused by rubbing or friction, by the abrading or gouging action of grit and other abrasives, etc., is indicated by the following results of the shot blast tests. In this test, steel shot No. 72 at 100 lb of pressure was directed for 40 min at test bars ⅜-in. square 2 1/16-in. long, with a rockwell A hardness of 92.5. No appreciable wear was noticeable, but surface finish was dulled slightly.

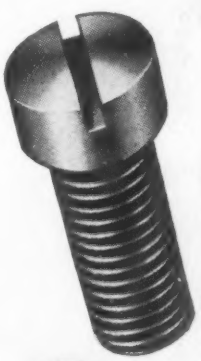
Metal carbides are reported to have proved to be equally effective in minimizing the undesirable effects of wear resulting from either extremely severe conditions; from "mild" conditions, or from complications by other factors such as great pressure or the presence of corrosive agents. For instance, solid carbide guide rings are used on wire stranding and textile machinery in which wire or thread is passed through the guides at a high speed.

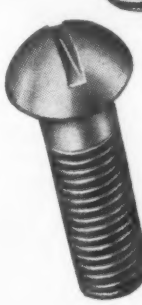
In the machinery field, metal carbides are used to great advantage in the manufacture of master gage blocks; for various ring and plug gages; for experimental sleeve bearings in machines; for rolls and pins used on automatics and semi-automatics in connection with roller turn-

TRIPLEX

for Toughness







Cap Screws in All Sizes and All Four Heads

Known around the World...

Tough, rugged, TRIPLEX threaded fasteners have a world-wide reputation for quality. They are engineered for hard service and long life.

Cap Screws in particular have to "take a beating" in today's high speed machinery and equipment. Using TRIPLEX Cap Screws will minimize your service and maintenance problems.

A turn to TRIPLEX is a turn to the better. Write for our new catalog. It's a handy-dandy.

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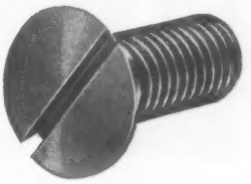

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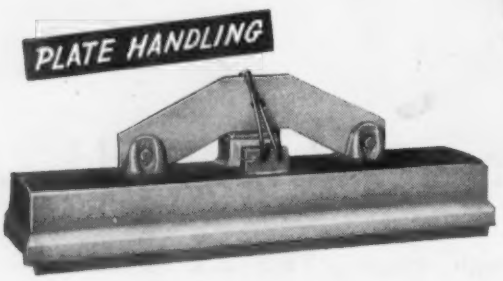
EC&M Magnets give a LIFT wherever needed

a size and type for every need

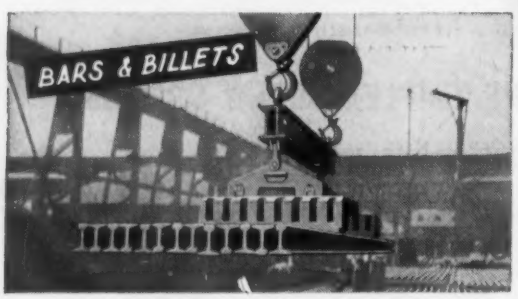
For odd jobs, specific jobs, and heavy, continuous duty applications — **for your every requirement**—we offer you the right size and type of magnet. Throughout nearly 50 years, we have built magnets to improve operations and reduce handling costs in foundries, steel mills, scrap yards, warehouses, and other places.

For heavy duty service such as handling scrap, pig iron, and nail kegs on a tonnage basis—Type SW All-Welded Circular Magnets. Streamlined design—high lifting capacity—watertight coil within a watertight housing. Bulletin 900.



For specific applications—used singly, in duplicate, or in triplicate on a spreader beam for long plates or other materials—Types P & F Rectangular Magnets. Sturdy, dependable, low maintenance. Bulletin 903.

For reaching into corners of plants and railroad cars, between machines and through narrow aisles—Type R Circular Magnets can be mounted on crane trucks making mobile units. Supplied in five sizes. The 29-inch diameter magnet, shown, receives 36-volt power directly from the truck. Sizes are available for all types and makes of crane trucks. Bulletin 904.



For hot or cold billet and rail handling—Type BR Magnets with circular-wound coils assuring great strength and high magnetic efficiency, also free circulation of air around coils. Bulletin 901.

Use the following coupon in sending for helpful literature on magnets suited to your needs.

THE ELECTRIC CONTROLLER & MFG. CO., Dept. 2
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Please send me Bulletin ☐ 900 ☐ 901 ☐ 903 ☐ 904

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er fixtures on lathes; and other similar places where wear conditions may be described as "mild" rather than "severe".

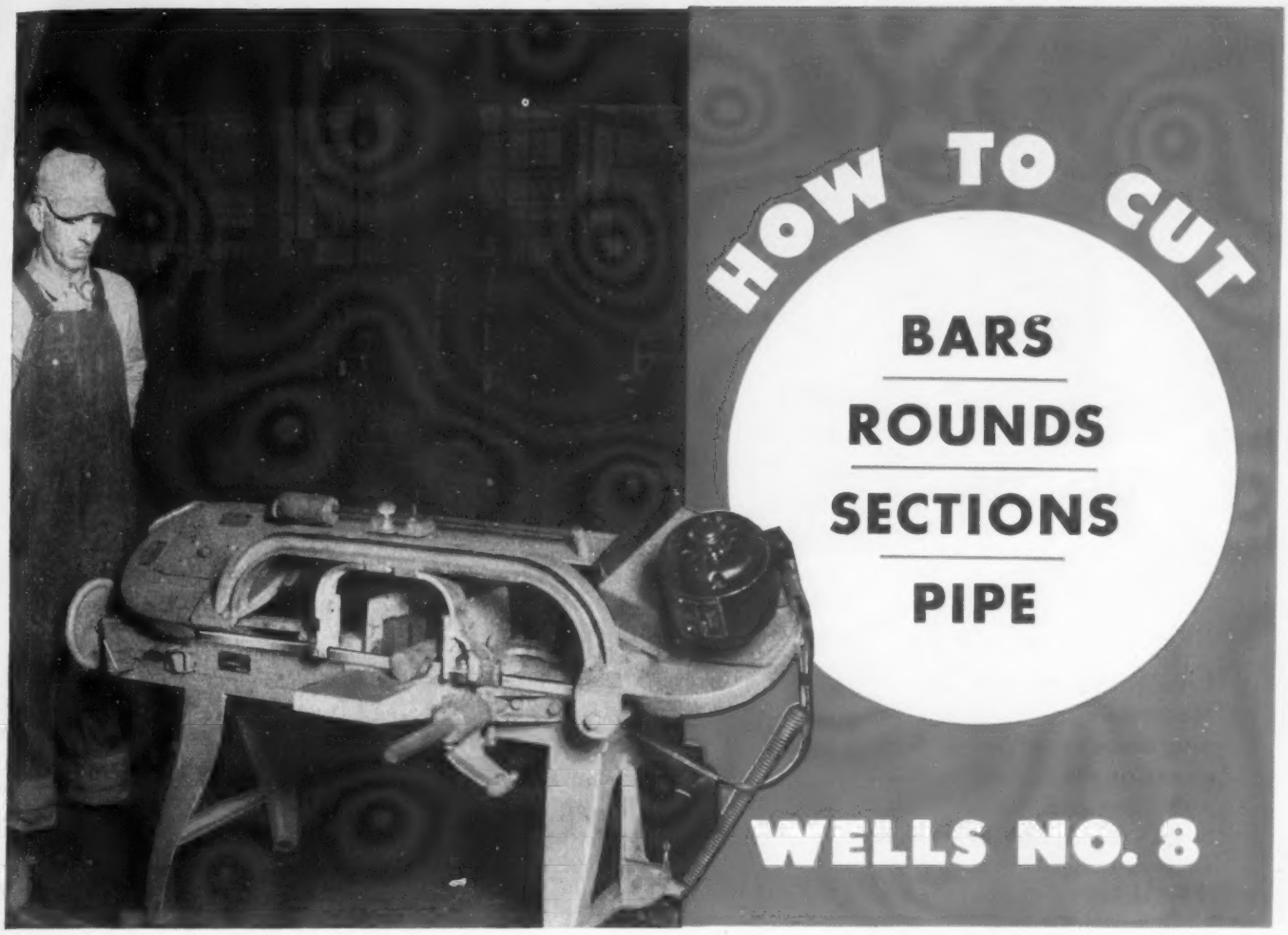
Among examples of carbides being used to withstand combinations of wear and pressure or erosion are nozzles for spray painting, especially where the paint contains an appreciable percentage of highly abrasive silica; ball and valve seat inserts for use in oil pumps, valves for regulating the flow of molten aluminum from the ladle into the mold; spray nozzles for dehydrating fruit juices, etc.

Heat Resistance: The hard metal carbides have exceptionally good heat resistance. As mentioned previously, no tempering or softening of the metal can be observed even at elevated temperatures. It is this property which enables carbide electrical contacts to give good service in high speed, low amperage telegraph transmission operations. Contacts of the type shown in Fig. 1, which have been brazed to the marking and spacing contacts and armature on this Western Union relay, are self-cleaning in that the material which becomes loosened through constant arcing drops away instead of fusing to the opposite side.

Impact Resistance: Repeated tests and applications have demonstrated that the impact resistance of metals made from powder is higher than is commonly believed. One instance of this is the cemented carbide tool being used in a steel mill for reconditioning extremely hard chilled iron rolling mill rolls. The refacing tool, as shown in Fig. 3, was mounted on the bed with a yoke and wedge arrangement. During the turning operation, the lathe was run at top speed giving a cutting speed of 15 surface fpm. The tool was fed into the cut by means of a wedge. While this method of feeding can scarcely be called ideal, no tip breakage was experienced.

Density: A wide range of densities is available in metal carbides. At one end of the range, carbides of a porous nature can be furnished, while at the other end of the scale, carbides with a density of 15.00 and even higher (lead has a density of 11.3) are obtainable. The full potentialities of this particular characteristic are at present unexplored. It is quite possible that in the future this wide variation in density may offer unusual opportunities to the designer.

Even with many advantages just discussed, metal carbides cannot be considered as a cure-all for every disease of design, fabrication, or operation. In the production of these metals, some limitations still exist. For instance, size of the parts to be made from carbides is currently limited (by equipment available) to between 100 and 120 lb. Solid carbide metal parts with a 100 sq in. top



METAL CUTTING BAND SAW

• If you have a variety of metal cutting jobs—bars, rounds, sections, pipe, tubes—it will pay you to investigate the advantages offered by portable, practical Wells saws. Simple in design and rugged in construction, the Wells No. 8 requires no highly skilled operator or special handling. Powerful, quick-acting vise reduces set-up time to a minimum. Gravity feed and automatic shut-off make it practical for one man to operate two or more Wells saws simultaneously. For production work, your Wells can be equipped with the new Wells Wet Cutting System for faster cutting and longer blade life. Ask for the complete story. Literature and quotations on request.

specifications

CAPACITY:
Rectangular . . . . . 8"x 16"
(Special Guides) . . . . . 5"x 24"
ROUNDS: . . . . . 8" diameter
MOTOR: . . . . . ½ H. P., A. C. or D. C.
SPEEDS:
Selective 60, 90, 130 feet per minute
WEIGHT: . . . . . Approximately 665 lbs.

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METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

Designing new products? Modernizing your plant? Planning on new equipment? Keep an eye on the uses of IngAclad —the low-cost Stainless-Clad Steel with dozens of applications in industry today.

With its 20% cladding of solid stainless steel, IngAclad offers maximum contact-side stainless protection at minimum cost.

On-the-job-proved by 14 years of continuous service.

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INGERSOLL *Steel Division*
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Plants: Chicago, Illinois
New Castle, Indiana
Kalamazoo, Michigan

surface can now be readily formed, although the shapes of such parts must fall within an 18-in. circle. Maximum height of such large sections is approximately 8 in. Within these limitations, however, there seems to be no limit to the shapes which can be produced. Availability of equipment to produce larger parts is dependent, of course, on demand for such parts. There is no basic reason why the range cannot be greatly extended, if necessary.

In some cases, cost is still a factor limiting the use of carbides, despite the great reduction in cost which has been achieved in recent years. Further increases in mass production as well as technical developments are, however, expected to result in further eventual price reductions.

Chart Gives Cutting Information

Information needed for cutting any metal by hand, power hack or band saw is obtained quickly from the metal cutting chart offered free on request by L. S. Starrett Co., Athol, Mass. The double-sided chart gives information about hack saw blades on one side. When a slide is set to indicate metal to be cut, the appropriate number of teeth per inch for hand blades and the correct pitch, speed and feed for power blades can be read on the pocket-sized chart.

Reverse side of chart gives information about band saw blades, including correct length and width of blade for any standard band saw machine and recommended number of teeth per inch and speed in feet per minute for any material.

Welded Steel Structure Manual Offered

A manual offering information covering fundamentals of design, materials, inspection, estimating and engineering control of welding and related operations is being sold by Air Reduction Sales Co., New York. The 300-page work was compiled by LeMotte Grover, affiliated with the American Society of Civil Engineers.

Included are chapters encompassing electrode requirements, specifications for welded connections for all sizes of rolled beams and a series of diagrams for rapid design of welded connections. Manual is based largely upon standards of American Welding Society, American Institute of Steel Construction and upon reports of Welding Research Council of Engineering Foundation.

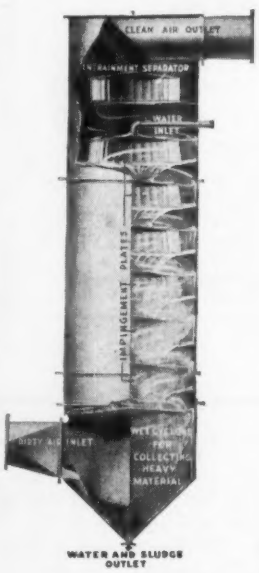
Copies of the bound manual, entitled "Manual of Design for Air Welded Steel Structures" are available on request.

LIQUIDATE
YOUR DUST AND FUMES!

Four Schneible 20,000 c.f.m. Senior Multi-Wash Collectors at a large metal-working plant, which has since ordered two more.

WE DO mean "liquidate"—in the sense of finality, and we refer to the Schneible wet method for eliminating contaminated air.

It is definitely profitable to install the most effective equipment for dust control throughout the plant, with due consideration for operating and maintenance costs. Clean air pays dividends. Schneible Multi-Wash equipment has proved so effective for dust and fume control that it is used by manufacturers everywhere.



For disposal of the dust, nothing equals the Schneible wet method. Schneible Multi-Wash Collectors use water to wash dust and fumes from the contaminated air. The collected matter, as sludge, flows to a dewatering tank (or waste). The sludge is settled out and the cleared water is re-circulated.

In operating and maintenance costs, a Schneible system is the absolute low. No attendance required. No bags or filters to shake daily or replace. No moving parts; nothing to break, clog, burn or rapidly wear.

Practically every dust and fume condition can be effectively controlled with standard Schneible units.

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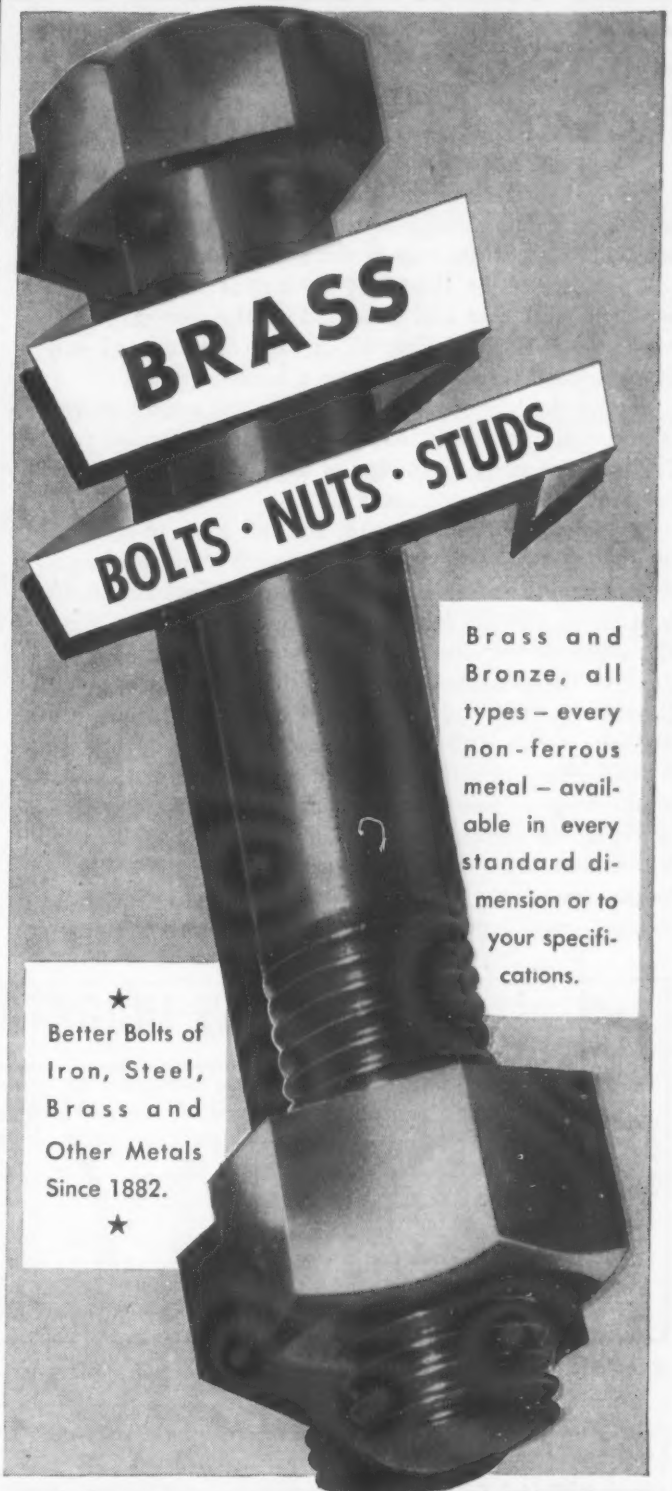

Brass and Bronze, all types – every non-ferrous metal – available in every standard dimension or to your specifications.

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS

The Business Trend

Coal Strike Quickly Cuts Industrial Production

FIRST half-week of the second soft coal strike in 1946 cut STEEL's industrial production index an estimated 8 points. This put the rate in the week ended Nov. 23 to 150 per cent of the 1936-1939 average of 100. The 158 per cent level that had prevailed in the two preceding weeks was a postwar high which had been attained only through small weekly gains over a lengthy period.

During the bituminous coal strike in the second quarter of this year, STEEL's industrial production index fell from 132 per cent at the beginning of the work stoppage to 94 per cent when the strike ended.

In the week ended Nov. 16, last full week of soft coal production before the latest mine work stoppage began, the estimated bituminous coal output was 12,550,000 tons, down 250,000 tons from the preceding week. Since the strike earlier this year a high rate of soft coal production prevailed with a result that this year's output through Nov. 16 had been raised to within 6.2 per cent of that for the corresponding period of 1945.

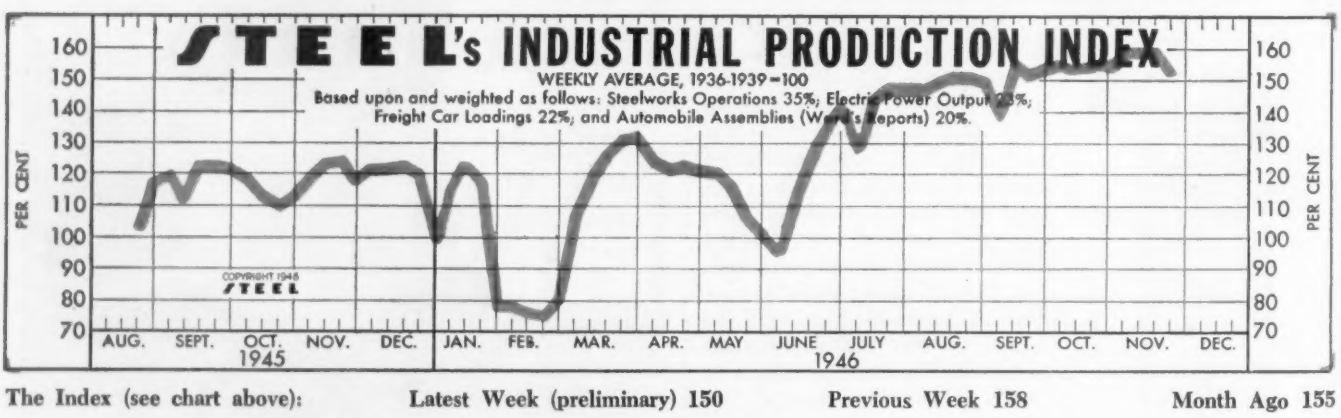
STEEL—One of the first to reflect the effect of the mine work stoppage was the steel industry. In the first half-week of the strike, the steel ingot production rate fell 8 points to 83.5 per cent of capacity as the steel industry began conserving remaining stocks of fuel. For many months, steel supply has been the principal concern of many manufacturers, and any interruption in the flow of steel intensifies and prolongs production problems.

AUTOS—The automobile industry will be one of the first to feel the drop in steel production. It has been predicted that continuation of the coal strike would result in practically complete suspension of automobile output by the middle of December. Production of passenger cars, trucks and busses in the week ended Nov. 23 totaled 94,973 units, only 454 less than the postwar high set in the week ended Nov. 2.

PRICES—In the first week after general decontrol of prices, the Bureau of Labor Statistics average wholesale price index rose to 135.8 per cent, compared with 134.8 per cent in the preceding week. Prices rose sharply for a number of industrial raw materials, many of which had been removed from price control earlier, but prices of many industrial products remained unchanged.

NEW BUSINESSES—Decline in the number of new business incorporations continued in September, when the total was only 9509 in 47 states, Dun & Bradstreet Inc. reported. This was the smallest total for any of the first nine months of 1946.

CONSTRUCTION— A 25 per cent increase in construction volume in 1947 over 1946 is predicted for the 37 states east of the Rocky mountains by F. W. Dodge Corp. Increases of 35 per cent in residential building, 7 per cent in nonresidential construction, and 22 per cent in public works and utilities would bring total construction to slightly more than $9.5 billion, compared with $7.7 billion expected this year.



The Index (see chart above): **Latest Week (preliminary) 150** **Previous Week 158** **Month Ago 155**

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)‡	83.5	91.5	90	80.5
Electric Power Distributed (million kilowatt hours)	4,680†	4,700	4,602	3,841
Bituminous Coal Production (daily av.—1000 tons)	2,091	2,133	2,085	1,919
Petroleum Production (daily av.—1000 bbls.)	4,750†	4,792	4,730	4,469
Construction Volume (ENR—Unit $1,000,000)	$77.8	$112.5	$55.2	$46.1
Automobile and Truck Output (Ward's—number units)	94,973	94,425	87,680	16,750

* Dates on request. ‡ 1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons. † Preliminary.

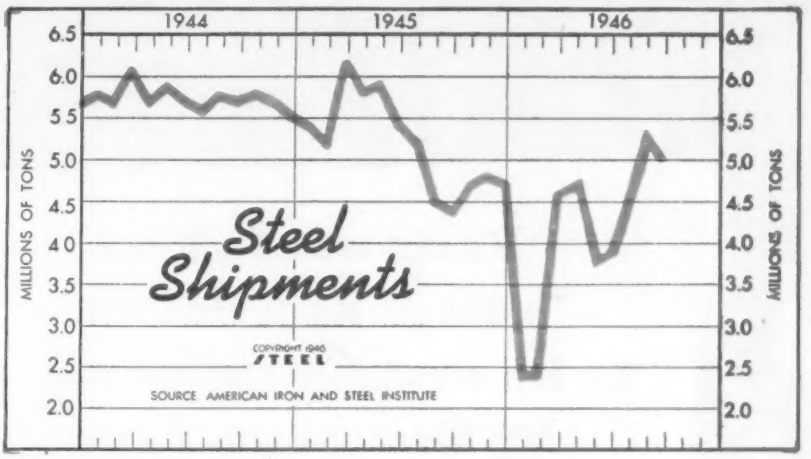
TRADE				
Freight Carloadings (unit—1000 cars)	803†	917	942	716
Business Failures (Dun & Bradstreet, number)	25†	28	33	7
Money in Circulation (in millions of dollars)‡	$28,689	$28,761	$28,585	$28,198
Department Store Sales (change from like wk. a yr. ago)‡	+24%	+20%	+24%	+ 9%

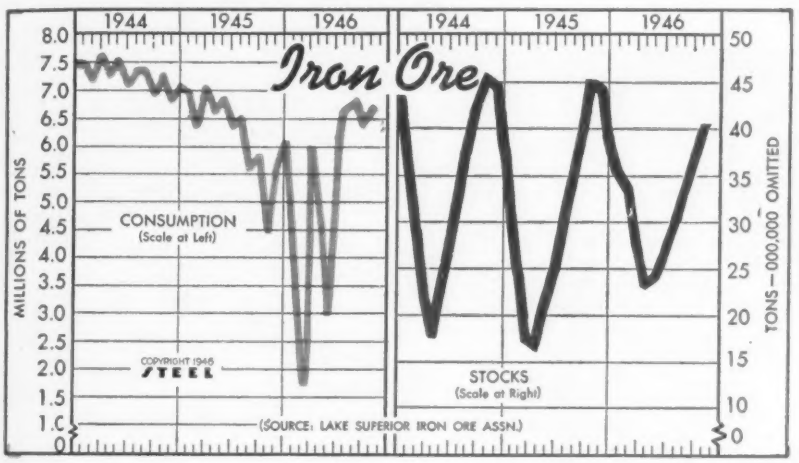
† Preliminary. ‡ Federal Reserve Board.

Steel Shipments
(Net Tons)

	1946	1945	1944
Jan.	2,391,850*	5,435,647	5,767,687
Feb.	2,391,849*	5,184,498	5,700,673
Mar.	4,644,988	6,179,452	6,146,595
Apr.	4,698,081	5,769,786	5,744,177
May	3,906,064	5,938,055	5,859,786
June	3,966,628	5,437,206	5,703,314
July	4,639,610	5,214,074	5,597,631
Aug.	5,406,470	4,512,637	5,837,328
Sept.	4,994,377	4,391,143	5,743,437
Oct.	.....	4,660,237	5,752,147
Nov.	.....	4,779,628	5,686,527
Dec.	.....	4,729,561	5,458,133

*Figures for January and February, 1946, are merely averages derived from a report that combined shipments for those two strike-affected months into a total of 4,783,699 tons.





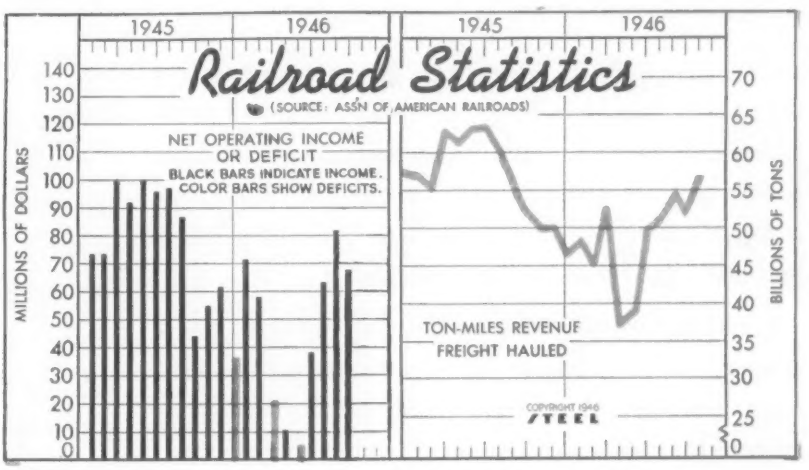
Iron Ore
(Lake Superior Iron Ore Assn.)
Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and furnaces	
	1946	1945	1946	1945
Jan.	3,719	6,983	35,342	30,889
Feb.	1,748	6,371	33,647	24,577
Mar.	6,021	7,082	27,601	17,304
Apr.	4,769	6,642	23,079	16,429
May	2,990	6,872	23,905	20,715
June	4,995	6,397	26,265	24,847
July	6,460	6,532	30,439	29,485
Aug.	6,738	5,658	34,067	34,781
Sept.	6,380	5,837	37,573	39,549
Oct.	6,625	4,491	40,435	45,090
Nov.	....	5,611	.....	44,706
Dec.	....	6,099	.....	39,059
Total	....	74,576	....	....

Statistics of Class I Railroads

	Net Operating Income —millions—			Ton-Miles Revenue Freight —billions—		
	1946	1945	1944	1946	1945	1944
Jan.	$70.8	$73.0	$84.9	48.2	56.8	60.5
Feb.	57.8	73.2	84.5	45.1	55.3	59.3
Mar.	*20.5	99.9	92.5	52.8	62.9	62.7
Apr.	10.1	91.9	87.7	37.0	61.6	60.4
May	* 4.8	99.9	98.5	39.0	63.4	64.0
June	38.1	96.1	99.8	50.0	63.6	62.0
July	62.8	97.1	98.6	51.5	60.5	62.8
Aug.	81.7	86.7	101.4	55.0	56.4	64.5
Sept.	67.4	44.0	89.1	52.7	52.2	61.0
Oct.	...	54.4	97.3	57.7	50.0	63.5
Nov.	...	61.3	91.6	...	50.0	59.4
Dec.	...	*36.9	69.8	...	46.5	57.3
Ave.	...	$70.0	$91.3	...	56.5	61.5

*Deficit.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,872	$11,248	$12,862	$12,595
Federal Gross Debt (billions)	$262.2	$262.0	$263.7	$264.6
Bond Volume, NYSE (millions)	$23.0	$18.6	$19.8	$41.3
Stocks Sales, NYSE (thousands)	5,862	4,614	4,715	8,205
Loans and Investments (billions)†	$57.5	$57.6	$58.3	$61.1
United States Gov't. Obligations Held (millions)†	$37,626	$37,967	$39,230	$45,176

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$64.45	$64.45	$64.45	$58.27
All Commodities†	135.8	134.8	135.1	106.3
Industrial Raw Materials†	152.6	152.2	146.3	119.1
Manufactured Products†	130.4	129.5	133.7	102.2

† Bureau of Labor Statistics Index, 1926=100.

At Shenango-Penn the centrifugal casting process isn't limited to plain rings, cylinders, or other parts of simple circular section. Advanced techniques permit us to cast almost any symmetrical shape centrifugally, thereby cinching a raft of advantages you just can't get by ordinary methods.

Metal for metal you gain greater strength, finer, denser, more uniform grain structure, freedom from porosity, blowholes and sand inclusions, better elongation, and superior resistance to wear and corrosion—qualities that have enabled Shenango-Penn to help many a machinery or equipment builder to make a good product still better, more durable . . . and usually at lower cost!

Check with Shenango-Penn on the parts you need. If you want them machined, rough-cut or finished to the nth degree of precision, we can take care of that too, in our modern, fully equipped shops.

FREE BULLETIN

Bulletin No. 143, yours for the asking, gives full information on Shenango-Penn centrifugally cast parts, including specifications, equivalents, and chemical and physical analyses of the many standard ferrous and non-ferrous alloys available. Write for this free data bulletin.

SHENANGO-PENN

SHENANGO-PENN MOLD COMPANY
461 WEST THIRD STREET • DOVER, OHIO
EXECUTIVE OFFICES: PITTSBURGH, PA.

ALL BRONZES • MONEL METAL • ALLOY IRONS

Steel Production Paralysis Threatened by Coal Strike

Operations drop to 65.5 per cent of capacity and may approximate low for year soon . . . Several nonintegrated mills announce price revisions

PARALYZING effect of the coal strike has reduced steel production to the third lowest point of the year, and if continued for another week will force the ingot rate below the 43 per cent capacity level experienced in the coal strike last spring.

Further, should the mine tie-up continue a few weeks longer, steel output may be curbed as effectively as it was early in the year, when the steel strike forced production down to around 5 per cent. The estimated rate for last week is 65.5 per cent.

While steel operations are tobogganing rapidly, metalworking and industrial production in general also are undergoing marked curtailment. Many plants are either being forced to suspend completely or will be forced to do so in the near future. The whole industrial economy of the country is receiving a jolt, which may prove disastrous, unless some break in the coal deadlock occurs.

As sheet steel consumers press for tonnage already due them, almost frantically in some instances in an effort to keep their plants from shutting down completely, their interest in future buying is lagging. Immediate problems are too urgent. Further, they realize the mills cannot possibly know where they stand under present chaotic conditions. Some orders are being issued, but in most cases they are being returned by the mills.

Although the large steel producers continue to hold prices unchanged, additional upward revisions in quotations on a number of products were effected by smaller interests last week. One producer of hot-rolled sheets advanced prices $5 a ton, effective Dec. 2, to 3.25c, Sparrows Point base. A midwestern mill no longer is quoting a coated specialty on a Sparrows Point base. Other important price changes, all by smaller producing companies, include an advance by one seller of $5 to $7 a ton on shapes; an increase of $9 on strip and more than $9 on spring steel by another seller. A producer of wire rods and bright wire also increased prices and pig iron prices were advanced $2 a ton by a Pennsylvania producer. One mill has advanced, effective Dec. 2, carbon steel plates $1 a ton, to 2.80c, Coatesville, Pa. It has also advanced alloy plate to 4.15c, Coatesville.

Some of the smaller independent plate mills have been able to sustain production fairly well since the coal strike. However, the overall average is down appreciably, and the outlook for next week is for drastic curtailment.

Shape production has been hit sharply by the coal strike, and the general unsettlement has reduced structural demand further.

In the scrap market, prices firmed in the steelmaking grades at a level about $5 a ton above the old OPA ceilings. Due to the sharp drop in steel production, mills hope to build up stocks of scrap but will be hampered if an embargo on railroad freight shipments is effected.

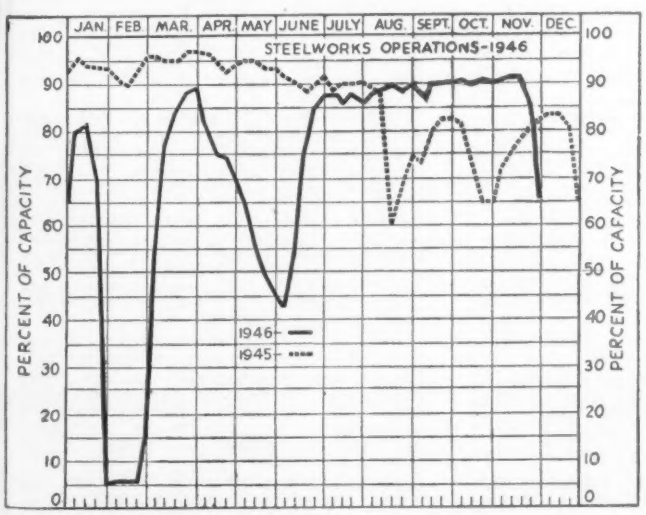
With few exceptions, production of steel was curtailed throughout the country. The national rate was estimated at only 65.5 per cent of capacity, a drop of 18 points from the previous week and 26 points from the next previous week. The sharpest decline was recorded in the Birmingham district where the rate dropped 52 points to 47 per cent, closely followed by declines of 41 points to 57 per cent in Pittsburgh and of 35 points to 40 per cent in Youngstown. Operations in Chicago at 74.5 per cent were off 12.5 points from the previously published rate and 15.5 points from the revised rate of 90 per cent for the week ended Nov. 23. Buffalo district rate last week was 51 per cent, drop of 10 points from the revised rate for the week ended Nov. 23. Declines of 12 points to 58 per cent in eastern Pennsylvania, 8 points to 85.5 per cent in Wheeling, 5 points to 84 per cent in Detroit, 3 points to 84 per cent in Cincinnati, and 1 point to 92 per cent in Cleveland were also recorded. St. Louis operations held unchanged at 72.5 per cent and New England at 90.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Nov. 30	Change	Same Week 1945	Same Week 1944
Pittsburgh	57	—41	78.5	91.5
Chicago	74.5	—12.5	93.5	100.5
Eastern Pa.	58	—12	78	95.5
Youngstown	40	—35	80	90
Wheeling	85.5	— 8	90	92.5
Cleveland	92	— 1	85	95
Buffalo	51	+ 2	88.5	79
Birmingham	47	—52	93	90
New England	90	None	82	90
Cincinnati	84	— 3	67	87
St. Louis	72.5	None	68	75
Detroit	84	— 5	91	88
Estimated national rate	65.5	—18	83.5	96.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.



COMPOSITE MARKET AVERAGES

	Nov. 30	Nov. 23	Nov. 16	One Month Ago Oct., 1946	Three Months Ago Aug., 1946	One Year Ago Nov., 1945	Five Years Ago Nov., 1941
Finished Steel	$64.45	$64.45	$64.45	$64.45	$64.45	$58.27	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	27.50	27.50	27.50	27.50	27.50	24.75	23.00
Steelmaking Scrap	24.17	24.17	24.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month. Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Nov. 30, 1946	Oct., 1946	Aug., 1946	Nov., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.86	2.86	2.86	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.48	2.48	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.558	2.558	2.558	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.75	3.75	2.90
Tin plate, per base box, Pittsburgh	*$5.25	*$5.25	*$5.25	$5.00

* Nominal.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to ⅜-inch, Pitts	2.30c	2.30c	2.30c	2.15c

Pig Iron

	Nov. 30, 1946	Oct., 1946	Aug., 1946	Nov. 1945
Bessemer del. Pittsburgh	$29.77	$29.77	$29.77	$26.94
Basic, Valley	28.00	28.00	28.00	25.25
Basic, eastern del. Philadelphia	29.93	29.93	29.93	27.09
No. 2 fdry., del. Pgh. N. & S. sides	29.27	29.27	29.27	26.44
No. 2 fdry., del. Philadelphia	30.43	30.43	30.43	27.59
No. 2 foundry, Chicago	28.50	28.50	28.50	25.75
Southern No. 2, Birmingham	24.88	24.88	24.88	22.13
Southern No. 2, del. Cincinnati	28.94	28.94	28.94	26.05
Malleable, Valley	28.50	28.50	28.50	25.75
Malleable, Chicago	28.50	28.50	28.50	25.75
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.00	33.00
Gray forge, del. McKees Rocks, Pa.	28.61	28.61	28.61	25.80
Ferromanganese, fob cars, Pittsburgh	140.00	140.00	140.00	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$25.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	24.00	18.75	18.75	18.75
Heavy melting steel, Chicago	23.75	18.75	18.75	18.75
Rails for rolling, Chicago	27.25	22.25	22.25	22.25
No. 1 cast, Chicago	35.00	25.00	20.00	20.00

Coke

Connellsville, furnace ovens	$8.75	$8.75	$8.75	$7.50
Connellsville, foundry ovens	9.50	9.50	9.50	8.25
Chicago, by-product fdry., del.	15.10	15.10	15.10	13.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, $33, fob mill; forging quality, $38, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop, $48.69.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41.50; Duluth (billets), $41; Pac. ports (billets), $51.50 (Andrews Steel Co., carbon slabs, $41.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49.50; Duluth, billets, $49; forging billets fob Pac. ports, $59.50.
(Andrews Steel Co., carbon forging billets, $50 gross ton at established basing points.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.43; del. Detroit $60.93; eastern Mich. $61.93.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon, sheet bars, $39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lb, $2.30. Do., over ⅜—$\frac{47}{64}$-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.535. Pittsburgh Steel Co., No. 5-⅜ in., $2.65; over ⅜ in., $3.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.635c; eastern Mich., 2.685c; New York, del., 2.86c; Phila., del., 2.86c; Gulf ports, dock, 2.885c; Pac. ports, dock, 3.185c (Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.056c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.108	4300	$1.839
2300	1.839	4600	1.298
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
3400	3.462	6145 or 6150	1.298
4000	0.487	8612	0.703
4100 (.15-.25 Mo)	0.757	8720	0.757
(.20-.30 Mo)	0.812	9830	1.407

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.624c; Detroit, del., 3.759c; eastern Mich., 3.809c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, 2.535c; Gulf ports, dock, 2.735c; Pacific ports, dock 2.785c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, del., 2.535c; Gulf ports, dock, 2.735c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.56c; eastern Mich., del., 2.61c; Phila., del., 2.615c; New York, del., 2.685c; Pacific ports, 3.01c. (Andrews Steel Co. quotes hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., 3.25c on hot carbon sheets, Sparrows Point, Md.; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.41c; eastern Mich., del., 3.46c; New York, del., 3.615c; Phila., del., 3.635c; Pacific ports, 3.96c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.31c; Phila., del., 4.24c; Pacific ports, 4.635c. (Granite City Steel Co., 4.50c, fob Granite City, Ill., 4.40c, fob Gary or Birmingham.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.635c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.335c; eastern Mich., 3.385c; Pacific ports, 3.885c; **20-gage:** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.935c; eastern Mich., 3.985c; Pacific ports, 4.485c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.685c	4.00c
Armature	4.25c	5.035c	4.35c
Electrical	4.75c	5.535c	4.85c
Motor	5.425c	6.21c	5.525c
Dynamo	6.125c	6.91c	6.225c
Transformer			
72	6.625c	7.41c	....
65	7.625c	8.41c	....
58	8.125c	8.91c	....
52	8.925c	9.71c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.585c; eastern Mich., del., 2.635c; Pacific ports, 3.135c. (Superior Steel Corp., 3.30c, Pitts.)

Over 6-in.: Base, 2.35c; Detroit, del., 2.485c; eastern Mich., del., 2.535c; Pacific ports, 3.035c. (Superior Steel Corp., 3.20c, Pitts.)

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.185c; eastern Mich., del., 3.235c; Worcester, base, 3.25c. (Superior Steel Corp., 4.70c, Pitts.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

(Maximum nominal tin plate prices permitted under OPA; actual market 25 points lower due to contract commitments.)

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed 4.335c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.835c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point, $4.65.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 15-lb $14.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.71c; Phila., del., 2.558c; St. Louis, del., 2.74c; Boston, del., 2.86c; Pacific ports, 3.085c; Gulf ports, 2.885c.

(Granite City Steel Co., carbon plates, 2.65c fob Chicago or Birmingham; Central Iron & Steel Co., Harrisburg, Pa., 3.05c, basing points; Lukens Steel Co., Coatesville, Pa., 2.80c, base; Worth Steel Co., Claymont, Del., Alan Wood Steel Co., Conshohocken, Pa., 2.75c base.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.435c; Gulf ports, 4.135c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.308c; Pacific ports, 4.525c.

Clad Steel Plates: Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; Geneva, Utah, 2.50c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.035c; Gulf ports, 2.735c.

(Phoenix Iron Co., Phoenixville, Pa., 3.05c, Bethlehem, Pa.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.235c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer *$3.05
Spring (except Birmingham) *$4.00

Wire Products to Trade

Nails and Staples

Standard and cement-coated ..... ‡$3.75
Galvanized ..... ‡$3.40

Wire, Merchant Quality

Annealed ..... §$3.50
Galvanized ..... §$.385

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier ... **72
Barbed wire, 80-rod spool ..... ††79
Barbless wire, twisted ..... ††79
Fence posts 74
Bale ties, single loop 72½

*Add $0.10 for Worcester, $0.05 for Duluth and $0.535 for Pacific ports.

‡Add $0.30 for Worcester, $0.535 for Pacific ports. Nichols Wire & Steel, $4.25; Pittsburgh Steel Co., $4.10.

‡Add $0.535 for Pacific ports.

§Add $0.10 for Worcester; $0.735 Pacific ports.

**Pittsburgh Steel Co., 77.

††Pittsburgh Steel Co., 89.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Welded

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	53	30	½	21	0½
¼ & ⅜	56	37½	¾	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut length 4 to 24 feet, inclusive.

O.D. sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Elec. Weld— Hot Rolled	Cold Rolled
1"	13	.....	$9.90	$9.36	$9.65
1¼"	13	.....	11.73	9.63	11.43
1½"	13	$10.91	12.96	10.63	12.64
1¾"	13	12.41	14.75	12.10	14.37
2"	13	13.90	16.52	13.53	16.19
2¼"	13	15.50	18.42	15.06	18.03
2½"	12	17.07	20.28	16.57	19.83
2¾"	12	18.70	22.21	18.11	21.68
2⅞"	12	19.82	23.54	19.17	22.95
3"	12	20.79	24.71	20.05	24.02
3½"	11	26.24	31.18	25.30	30.29
4"	10	32.56	38.68	31.32	37.52
4½"	9	43.16	51.29	.....	.....
5"	9	49.96	59.36	.....	.....
6"	7	76.71	91.14	.....	.....

Pipe, Cast Iron: Class B, 6-in. and over, $60 per net ton, Birmingham; $65, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.

Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates $51 net ton, base, Standard spikes, 3.65c

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Base prices advanced 12 per cent, effective July 27, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅞ and ⅝ x 6-in. and shorter.. 63½ off
Do., ¾ to 1 x 6-in. and shorter..... 61 off
1⅛ and larger, all lengths..... 59 off
All diameters, over 6-in. long..... 59 off.
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-in. and smaller	..	64
⅞-in. and smaller	62	..
½-in.-1-in.	..	60
⅞-in.-1-in.	59	..
1⅛-in.-1½-in.	57	58
1⅝-in. and larger	56	..

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset 1-in. and smaller ..... 71 off
Headless, ¼-in. and larger ..... 60 off
No. 10 and smaller ..... 70 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural 4.75c
½-inch and under ..... *65-5 off
*Plus 12 per cent increase on base prices, effective July 26.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
....	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb

CHROMIUM NICKEL STEELS

	Bars	Plates	Sheets	H.R. Strip	C.R. Strip
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.50
312	38.95	43.28	53.02	....	....
*316	43.28	47.61	51.94	43.28	51.94
‡321	31.38	36.79	44.36	31.65	41.12
†347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.36

STRAIGHT CHROMIUM STEEL

403	23.93	26.51	31.92	22.99	29.21
**410	20.02	23.93	28.67	18.39	23.90
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.36
‡‡430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	39.49
442	24.35	27.59	35.17	25.98	34.62
443	24.35	27.59	35.17	25.98	34.62
446	29.76	33.00	39.19	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.49

STAINLESS CLAD STEEL (20%)

(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

304	....	19.48	20.56	....	....
410	....	17.31	18.39	....	....
430	....	17.85	18.94	....	....
446	....	19.48	20.56	....	....

* With 2-3% molybdenum. § With titanium. † With columbium. ** Plus machining agent. †† High carbon. ‡‡ Free machining.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$8.75
Connellsville, foundry	9.25- 9.75
New River, foundry	10.25-10.50
Wise county, foundry	9.00- 9.50
Wise county, furnace	8.50- 9.00

By-Product Foundry

Kearney, N. J., ovens	14.40
Chicago, outside delivered	14.25
Chicago, delivered	15.10
Terre Haute, delivered	14.85
Milwaukee, ovens	15.10
New England, delivered	16.00
St. Louis, delivered	†15.10
Birmingham, delivered	12.25
Indianapolis, delivered	14.85
Cincinnati, delivered	14.60
Cleveland, delivered	14.50
Buffalo, delivered	14.75
Detroit, delivered	15.10
Philadelphia, delivered	14.65

* Operators of hand-drawn ovens using trucked coal, $9.35.

† 15.68 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal, freight allowed east of Omaha.

Pure and 90% benzol	15.00c
Toluol, two degree	22.00c
Industrial xylol	22.00c
Per pound fob works	
Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.00c
Per ton, bulk, fob plants	
Sulphate of ammonia	$30.00

WAREHOUSE STEEL PRICES

Base delivered prices, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in. and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.356[1]	4.203[1]	4.203[1]	6.039[1]	4.050[1]	5.548[1]	4.418[1]	5.725[13]	5.031[14]	4.656[21]	4.968
New York	4.134[1]	4.038[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[13]	4.838[14]	4.584[21]	5.075
Jersey City	4.155[1]	4.018[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[13]	4.890[14]	4.605[21]	5.075
Philadelphia	4.114[1]	3.937[1]	3.875[1]	5.564[1]	3.774[1]	4.664[1]	4.554[1]	5.499[13]	5.139[20]	4.564[21]	5.064
Baltimore	4.093[1]	4.05[1]	3.865[1]	5.543[1]	3.64[1]	4.293[1]	4.193[1]	5.365[17]	5.118[20]	4.543[21]	....
Washington	4.232[1]	4.22[1]	4.067[1]	5.632[1]	3.842[1]	4.432[1]	4.332[1]	5.667[17]	5.007[24]	4.532[21]	....
Norfolk, Va.	4.377[1]	4.303[1]	4.262[1]	5.777[1]	4.037[1]	4.927[1]	4.477[1]	5.862[17]	4.552[24]	4.677[21]	....
Bethlehem, Pa.*	....	3.70[1]	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Buffalo (city)	3.60[1]	3.65[1]	3.92[1]	5.55[1]	3.575[1]	4.21[1]	4.11[1]	5.20[15]	4.625[16]	4.20[21]	4.96
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[15]	4.525[16]	4.10[21]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[24]	4.20[21]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[13]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.88[1]	3.65[1]	5.48[1]	3.575[1]	3.95[1]	3.850[1]	5.347[13]	4.625[24]	4.20[21]	4.70
Cleveland (country)	3.50[1]	....	3.55[1]	....	3.475[1]	3.85[1]	3.750[1]	....	4.525[24]	4.10[21]	4.00
Detroit	3.735[1]	3.987[1]	3.935[1]	5.607[1]	3.710[1]	4.085[1]	3.985[1]	5.526[13]	4.760[24]	4.25[13]	4.985
Omaha (city, del.)	4.32[1]	4.37[1]	4.37[1]	5.97[1]	4.045[1]	4.52[1]	4.42[1]	6.00[15]	5.72[24]	4.945[21]	....
Omaha (country)	4.22[1]	4.27[1]	4.27[1]	5.87[1]	3.945[1]	4.42[1]	4.32[1]	5.90[15]	....	....	....
Cincinnati	3.902[1]	3.983[1]	3.952[1]	5.583[1]	3.671[1]	4.046[1]	3.946[1]	5.296[13]	4.271[24]	4.602[21]	....
Youngstown*	....	....	....	....	....	....	....	4.85[13]	....	....	....
Middletown, O.*	....	....	....	....	3.475[1]	3.85[1]	3.750[1]	5.10[15]	....	....	....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	5.40[15]	4.425[24]	4.20[21]	4.90
Milwaukee	3.908[1]	3.958[1]	3.958[1]	5.558[1]	3.633[1]	4.108[1]	4.008[1]	5.558[15]	4.583[24]	4.358[21]	5.058
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.743[1]	4.118[1]	4.018[1]	5.368[15]	4.793[24]	4.43[21]	5.060
St. Paul	4.092[1]	4.142[1]	4.142[1]	5.742[1]	3.817[1]	4.292[1]	4.192[1]	5.666[15]	4.767[24]	4.852[21]	5.398
St. Louis	3.918[1]	3.968[1]	3.968[1]	5.568[1]	3.643[1]	4.118[1]	4.018[1]	5.622[15]	4.593[24]	4.522[21]	5.222
Memphis, Tenn.	4.296[1]	4.346[1]	4.346[1]	6.071[1]	4.221[1]	4.596[1]	4.496[1]	5.746[15]	....	4.821[21]	....
Birmingham	3.75[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	4.05[1]	5.20[15]	5.077[24]	4.99[21]	5.465
New Orleans (city)	4.358[1]	4.408[1]	4.408[1]	6.329[1]	4.283[1]	4.658[1]	....	5.808[15]	5.304[24]	5.079[21]	....
Houston, Tex.	4.00[3]	4.50[1]	4.50[1]	5.75[3]	3.988[3]	4.668[3]	4.568[3]	5.768[26]	5.819[16]	4.10[21]	....
Los Angeles	4.65[4]	4.70[4]	5.80[4]	7.05[4]	4.95[4]	5.30[4]	5.200[4]	6.55[13]	6.60[3]	6.105[21]	5.868
San Francisco	4.235[7]	4.185[7]	4.185[7]	5.885[7]	4.16[7]	5.885[1]	4.535[1]	6.385[15]	6.91[15]	5.783[21]	7.588
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[15]	6.825[15]	5.983[15]	....
Tacoma, Wash.	4.60[3]	4.70[3]	5.00[3]	6.75[3]	4.87[3]	5.80[3]	4.60[3]	6.40[15]	6.55[15]	6.23[21]	....
Seattle	4.60[3]	4.70[3]	5.00[3]	6.75[3]	4.87[3]	5.80[3]	4.60[3]	6.40[15]	6.55[15]	6.23[21]	....

* Basing point cities with quotations representing mill prices, plus warehouse spread.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—800 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [26]—1000 to 1999 pounds; [30]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.45
Mesabi nonbessemer	5.05
High phosphorus	5.05
Mesabi bessemer	5.20
Old range nonbessemer	5.30

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, cfi Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.,	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	18.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash. ($ $ paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$28.30
48% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)

48% 3:1	$43.50

less $7 freight allowance.

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to established premiums, penalties and other provisions. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 15c to 17c per unit less than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn	Si	Cr	Ni	Mo	Basic open-hearth Electric furnaces — Bars per 100 lb	Billets per GT	Bars per 100 lb	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.28	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.921c per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

PIG IRON

Maximum prices per gross ton. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$29.50	$29.00	$32.50	$30.00
Newark, N. J., del.	31.20	30.70	32.20	31.70
Brooklyn, N. Y., del.	32.28	....	....	32.78
Birdsboro, Pa., base	31.50	31.00	32.50	32.00
Birmingham, base	24.88	23.50	29.50	....
Baltimore, del.	30.22	....	....	....
Boston, del.	29.62	....	....	....
Chicago, del.	28.72	....	....	....
Cincinnati, del.	28.94	28.06	....	....
Cleveland, del.	28.62	27.74	....	....
Newark, N. J.	30.82	....	....	....
Philadelphia, del.	30.05	29.56	....	....
St. Louis, del.	28.62	29.54	....	....
Buffalo, base	28.50	27.50	29.50	29.00
Boston, del.	30.00	29.50	31.00	30.50
Rochester, del.	30.03	....	31.03	30.53
Syracuse, del.	30.58	....	31.58	31.08
Chicago, base	28.50	28.00	29.00	28.50
Milwaukee, del.	29.73	29.23	30.23	29.73
Muskegon, Mich., del.	32.05	....	....	32.05
Cleveland, base	28.50	28.00	29.00	28.50
Akron, Canton, del.	30.04	29.54	30.54	30.04
Detroit, base	28.50	28.00	29.00	28.50
Saginaw, Mich., del.	30.81	30.31	31.31	30.81
Duluth, base	29.00	28.50	29.50	29.00
St. Paul, del.	31.13	30.63	31.63	31.13
Erie, Pa., base	28.50	28.00	29.50	29.00
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	28.50	28.00	29.00	28.50
St. Louis, del.	29.00	28.50	....	29.00
Hamilton, O., base	28.50	28.00	....	28.50
Cincinnati, del	29.68	29.18	....	29.68
Neville Island, Pa., base	28.50	28.00	29.00	28.50
*Pittsburgh, del., N.&S. sides	29.27	28.77	29.77	29.27
Provo, Utah, base	26.50	26.00	....	....
Sharpsville, Pa., base	28.50	28.00	29.00	28.50
Sparrows Point, base	29.50	29.00	....	....
Baltimore, del.	30.60	....	....	....
Steelton, Pa., base	....	29.00	....	....
Swedeland, Pa., base	29.50	29.00	30.50	30.00
Philadelphia, del.	30.43	29.93	....	30.93
Toledo, O., base	28.50	28.00	29.00	28.50
Youngstown, O., base	28.50	28.00	29.00	28.50
Mansfield, O., del.	30.66	30.16	31.16	30.66

* To Neville Island base add: 61c for McKees Rocks, Pa.; 93c Lawrenceville Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.24, Oakmont, Verona; $1.38, Brackenridge.

Exceptions to above prices: Struthers Iron & Steel Co., Struthers, O., charges 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron. Republic Steel Corp. quotes $2 a ton higher for foundry and basic pig iron on the Birmingham base.

High Silicon, Silvery

6.00-6.50 per cent (base).....$34.00
6.51-7.00 .. $35.00 9.01- 9.50.. 40.00
7.01-7.50 .. 36.00 9.51-10.00.. 41.00
7.51-8.00 .. 37.00 10.01-10.50.. 42.00
8.01-8.50 .. 38.00 10.51-11.00.. 43.00
8.51-9.00 .. 39.00 11.01-11.50.. 44.00

Fob Jackson county, O., per gross ton. Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $50, Jackson, O.; $53.25 Keokuk, Iowa; $51.25 Niagara Falls, N. Y. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $28.00
Valley base 28.00

Low Phosphorus

Steelton, Pa., Buffalo, N. Y., $34, base; $35.38, del., Philadelphia. Birdsboro, Pa., $36, base; $37.38, del., Philadelphia. Intermediate phosphorus Central furnace, Cleveland, $31.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point
Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $81.00

High Heat Duty

Pa., Ill., Md., Mo., Ky. 65.00
Ala., Ga. 65.00
N. J. 70.00

Intermediate Heat Duty

Ohio 57.00
Pa., Ill., Md., Mo., Ky. 59.00
Ala., Ga. 51.00
N. J. 62.00

Low Heat Duty

Pa., Md., Ohio 51.00

Malleable Bung Brick

All bases 75.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press 42.00
Wire Cut 40.00

Silica Brick

Pennsylvania 65.00
Joliet, E. Chicago 74.00
Birmingham, Ala. 65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.
Bulk 22.00
Bags 26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick 54.00
Chem. bonded chrome 54.00
Magnesite brick 76.00
Chem. bonded magnesite 65.00

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

Open Market Prices of Leading Ferroalloy Products

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $40; Pittsburgh, $40.50; Chicago, $40.60.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone; Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed: 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Ferrotungsten: Spot 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Ferrovanadium: V 35-55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb. contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%. Deduct 0.85c for bulk carlots.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) per lb of alloy contract ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices up 10 cents.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; **high carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, lump packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.05c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.15c; ton lots 21.00c, less ton lots 22.00c eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 9.50c, ton lots 9.50c less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.3c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Chromium Metal: 97% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c, central 81c and 82.60c; western 82.25c and 84.75c fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract ton lots or more $1.35, less $1.60, pound of metal; $1.36 and $1.61

central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed: 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western, spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 12.90c; 2000 lb to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c; central 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. **Ferrosilicon,** weighing about 5 lb and containing exactly 2 lb Si, or about 2½ lb and containing exactly 1 lb Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal eastern zone bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, $1.90, 1 ton to 8 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11% Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

Silvaz Alloy: (Si 35-40%, Ca 9-11% Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, Central; 60.50c, 61.90c and 62.90c, western spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c, central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c and 13.00c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Zirconium Alloy: 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

Alsifer: Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; less 7.25c. Spot up ½c.

Simanal: Approx. 20% each Si., Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, less-ton lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5:84% NA_2O; or air dried, 83-85% V_2O_5 and 5.15% NA_2O, $1.10 per lb contained V_2O_5, fob plant freight allowed on quantities of 25 lb and over to St. Louis.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, delivered at consumer's plant except where noted.

OPEN HEARTH AND BLAST FURNACE GRADES

	—Heavy Melting—			—Bundles—							
	No. 1	No. 2	No. 1 Busheling	No. 1	No. 2	No. 3	Machine Shop Turnings	Mixed Borings, Turnings	Short Shovel Turnings	Cast Iron Borings
Pittsburgh	25.00	25.00	25.00	25.00	25.00	23.00	20.00	20.00	22.00	21.00
Philadelphia	23.75–24.25	23.75–24.25	23.75–24.25	23.75–24.25	23.75–24.25	....	18.75–19.25	18.75–19.25	20.75–21.25	18.75–19.25
Cleveland	24.50	24.50	24.50	24.50	24.50	22.50	17.00	17.00	19.00	16.50
Buffalo	24.25	24.25	24.25	24.25	24.25	22.25	16.75	16.75	18.75	17.75
•Boston	20.35	20.35	20.35	20.35	20.35	....	14.00	14.00	16.00	....
Valley	25.00	....	....	25.00	....	....	17.50	....	19.50	18.50
Mansfield	....	....	....	....	....	....	17.50	....	....	....
Chicago	23.75	23.75	23.75	23.75	23.75	21.75	16.75	16.75	18.75	17.25
Birmingham	22.00–22.50	22.00–22.50	22.00–22.50	22.00–22.50	22.00–22.50	20.00–20.50	14.50–15.00	14.50–15.00	16.50–17.00	15.50–16.00
San Francisco	19.50	19.50	19.50	19.50	19.50	10.00	8.00	....	....	....
Cincinnati	24.50	24.50	24.50	24.50	24.50	....	16.20	16.20	18.20	15.20
‡Detroit	22.32	....	22.32	22.32	22.32	20.32	17.32	17.32	19.32	18.32
‡New York	20.33	20.33	20.33	....	20.33	18.33	15.33	15.33	17.33	....
St. Louis	22.22	22.22	....	....	....	....	14.72	....	16.72	....
Seattle	17.00	17.00	....	....	....	....	....	....	....	....
Los Angeles	16.50	15.50	....	14.50	14.50	....	8.00	8.00	....	....

ELECTRIC FURNACE, FOUNDRY AND SPECIAL GRADES

	Bar Crops and Plate	Cast Steel	Punchings and Plate Scrap	Electric Furnace Bundles	Heavy Turnings	Alloy Free Turnings	Cut Structural —and Plate Scrap— 1 ft and under	2 ft and under	No. 1 Chemical Borings	Tin Can Bundles
Pittsburgh	27.50	27.50	27.50	26.00	24.50	23.00	27.50	27.00	24.00	21.00
Philadelphia	26.25–26.75	26.25–26.75	26.25–26.75	25.25–25.75	23.25–23.75	....	26.25–26.75	26.25–26.75	22.75–23.25	....
Cleveland	27.00	27.00	27.00	25.50	24.00	22.50	27.00	26.50	23.50	20.50
Buffalo	....	27.00	28.50	28.50	22.50	19.75	28.50	28.50	22.75	....
•Boston	....	....	....	....	....	....	....	....	20.31	....
Chicago	....	....	26.75	....	....	....	....	....	....	....
San Francisco	18.00	18.00	....	....	....	8.00	20.50	20.00	....	17.00
‡Detroit	....	....	24.82	23.82	....	....	....	....	....	....
‡New York	....	....	22.83	21.33	....	....	22.83	22.33	19.33	....
Birmingham	24.50–25.00	24.50–25.00	24.50–25.00	....	....	....	24.50–25.00	24.50–25.00	....	....

STEEL GRADES OF RAILROAD ORIGIN

	No. 1 Heavy Melting R.R. Steel	Railroad Malleable	Axles	Rails — Rerolling	Random Lengths	Cut 3-ft. and under	Cut 18-in. and under	Railroad Specialties	Uncut Tires	Angles, Splice Bars
Pittsburgh	26.00	27.00	31.00	28.50	26.50	28.50	29.50	29.50	28.50	28.50
Valley	23.50	....	....	....	....	....	....	....	....	....
†Chicago	24.75	27.00	....	27.25	25.25	27.25	28.50	27.75	....	27.25
Cincinnati	25.50	27.00	....	....	....	....	....	....	....	....
St. Louis	....	28.00	27.00	25.00	24.00	27.50	....	....	23.50	23.50
Birmingham	23.00–23.50	....	....	25.50–26.00	24.00–24.50	26.50–27.00	27.50–28.00	....	....	25.50–26.00
San Francisco	....	....	26.50	....	21.00	....	....	....	23.00	....
Seattle	17.00	....	....	....	....	....	....	....	....	....

CAST IRON GRADES

	No. 1 Cupola Cast	Charging Box Cast	Heavy Breakable Cast	Stove Plate	Unstripped Motor Blocks	Malleable	Brake Shoes	Clean Auto Cast	No. 1 Wheels	Burnt Cast
Pittsburgh	30.00–34.00	24.00–26.00	23.00–23.00	26.00–28.00	23.00–25.00	27.00–29.00	20.75–22.75	30.00–32.00	25.00–27.00	20.75–22.75
Philadelphia	38.00–40.00	35.00–36.00	35.00–36.00	....	35.00–36.00	35.00	23.50–24.00	37.00	34.00	....
Buffalo	29.50	....	24.00	25.00	24.00	....	....	....	....	24.00
•Boston	35.00	31.00	30.00	33.00	31.50	....	....	37.00	....	....
•Chicago	30.00–40.00	....	....	....	....	30.00–40.00	....	....	....	....
•Seattle	25.00	....	....	....	....	....	....	....	....	....
Cincinnati	33.00	31.00	28.00	31.00	33.00	....	23.00	33.00	....	....
‡Detroit	35.00–37.00	....	28.00–30.00	....	....	....	....	35.00–37.00	....	....
•St. Louis	25.00–30.00	25.25	22.75	27.00	....	....	20.25	32.00	26.00	20.25
‡New York	32.00–33.00	26.00–27.00	26.00–27.00	30.00–31.00	28.00–29.00	30.00	....	....	....	....
Birmingham	30.00	....	25.00	28.00	25.00	....	22.75	....	27.00	....
Los Angeles	30.00	....	....	....	....	....	....	....	....	....

• Fob shipping point; † fob tracks; ‡ dealers buying prices.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 19.50c, del. Conn.; less carlots 19.62½c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 19.25c, refinery, 20,000 lb or more; 19.50c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 20.50c; 88-10-2 (No. 215) 24.75c; 80-10-10 (No. 305) 23.50c; No. 1 yellow (No. 405) 16.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Price western 10.50c, select 10.60c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.75c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 11.65c, chemical 11.75c, corroding 11.75c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.62½c; No. 12 foundry alloy (No. 2 grade) 15.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.25c; grade 2 (92-95%) 15.75c; grade 3 (90-92%) 15.50c; grade 4 (85-90%) 15.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straights, 70.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 69.87½c; Grade C, 99.65-99.79% incl. 69.62½c; Grade D, 99.50-99.64% incl., 69.50c; Grade E, 99-99.49% incl. 69.12½c; Grade F, below 99% (for tin content), 69.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 23.50c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 24.00c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, fob refinery 38.50c lb; pig and shot produced from electrolytic cathodes 39.50c; "F" nickel shot or ingot for additions to cast iron, 37.50c. Prices include import duty.

Mercury: Open market, spot, New York, $89-$93 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.25-$1.50 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.30-$1.55.

Cobalt: 97-99%, $1.50 lb. for 550 lb (bbl.); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N.Y. 90.12½c per ounce.

Platinum: $70.50 per ounce.

Palladium: $24 per troy ounce.

Iridium: $125 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 19.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 30.93c; yellow brass 27.53c; commercial bronze, 95% 31.07c, 90% 30.56c; red brass, 85% 29.53c, 80% 29.02c; best quality 26.98c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 35.79c; nickel silver, 18%, 39.82c; phosphor bronze, grade A, 5%, 48.82c.

Rods: Copper, hot rolled 27.28c, cold drawn 28.28c; yellow brass, free cutting, 22.28c, not free cutting 27.22c; commercial bronze, 95% 30.76c, 90% 30.25c; red brass, 85% 29.22c, 80% 28.71c; best quality 28.13c.

Seamless Tubing: Copper 30.97c; yellow brass 30.29c; commercial bronze 90% 32.97c; red brass 85% 32.19c, 80% 31.68c; best quality brass 30.85c.

Copper Wire: Bare, soft, fob eastern mills, carlots 25.52c, less carlots 26.02c; weatherproof, fob eastern mills carlot 26.42c, less carlots 26.92c; magnet, delivered, carlots, 28.95c, 15,000 lb or more 29.18c, less carlots 29.68c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: Full sheets 14.90c; cut sheets 15.40c; pipe, full coils 14.15c, cut coils 14.65c.

Zinc Products: Sheet fob mill 15.40c, 36,000 lb and over deduct 7%, Ribbon and strip 14.50c; 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 13.25c; 1-3 tons 14.25c; 500-2000 lb 14.75c; 100-500 lb 15.25c; under 100 lb 16.25c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., nom.; curved, nom.; round oval straight, nom. electro-deposited, nom.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels nom.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls. nom., fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00c lb, del.

Tin Anodes: 1000 lb and over nom. del.; 500-999 nom.; 200-499 nom.; 100-199 nom.

Tin Crystals: 400 lb bbls nom., fob Grasselli, N. J.; 100-lb kegs nom.

Sodium Stannate: 100 or 300-lb drums nom., del.; tons lots nom.

Zinc Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ½c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	17.125	17.125	16.375
Yellow brass	13.750	13.250	12.875
Commercial Bronze			
95%	15.875	15.625	15.125
90%	15.750	15.500	15.000
Red brass			
85%	15.500	15.250	14.750
80%	15.375	15.125	14.625
Best Quality (71-79%)	14.625	14.375	.....
Muntz metal	12.875	12.625	12.125
Nickel silver, 5%	14.500	14.250	7.250
Phos. bronze, A, B	18.125	17.875	16.875
Naval brass	13.250	13.000	12.500
Manganese bronze	13.250	13.000	12.375

BRASS MAKERS' BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.25, No. 2 copper 16.25, light copper 15.25, composition red brass 15.50, auto radiators 13.00, heavy yellow brass 11.75, brass pipe 11.75.

DEALERS' BUYING PRICES

(Cents per pound in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 13.50-13.75; No. 2 12.50-13.00; light copper 12.00-12.25, No. 1 composition red brass 13.00-13.50, No. 1 composition turnings 13.00-13.50, mixed brass turnings 8.00-8.50, new brass clippings 12.00-12.25, No. 1 brass rod turnings 10.00-10.25, light brass 8.00-8.25, heavy yellow brass 8.50-8.75, new brass rod ends 10.50-10.75, auto radiators, unsweated, 10.50-10.75, clean red car boxes 9.00-9.50, cocks and faucets 10.00-10.50, brass pipe 10.00-10.50.

Lead: Heavy lead 9.25-9.50, battery plates 6.50-6.75, linotype and stereotype 10.50-11.00, electrotype 9.50-10.00, mixed babbitt 10.00-10.50; solder joints, 10.25-10.50.

Zinc: Old zinc 5.50-6.00, new die cast scrap 4.75-5.00, mixed die cast scrap 3.75-4.00.

Tin: No. 1 pewter 45.00-46.00, block tin pipe 60.00-62.00, auto babbitt 36.00-37.00, No. 1 babbitt 35.00-36.00, siphon tops 38.00-40.00.

Aluminum: Clippings, 2S, 8.50-9.00, old sheets 6.00-6.50, crankcases 6.75-7.00, borings and turnings 3.00-3.25, pistons, free of struts, 4.75-5.00.

Nickel: Anodes 17.00-18.00, turnings 14.50-15.50, rod ends 17.00-18.00.

Monel: Clippings 14.00-15.00, turnings 9.00-10.00, old sheet 10.00-11.00, rods 10.00-10.50, castings 7.00-7.50.

Sheets, Strip . . .

Two nonintegrated producers establish new price schedule on long ternes

Sheet & Strip Prices, Page 168

Pittsburgh — Integrated mills are expected to channel bulk of limited steel ingot output into production of flat-rolled steel items as long as possible throughout the coal strike. Even under this policy it is questionable how long present sheet and strip production schedules can be maintained, for slab stocks are well below normal and ingot output has been sharply reduced in most instances.

In addition to adjustments in galvanized, galvannealed and corrugated culvert sheet prices recently made by a few relatively small producers, it is reported that Andrews Steel Co., Newport, Ky., and Superior Sheet Steel Co., Canton, O., established a new schedule on long ternes; now quoting on a No. 10 gage instead of old base gage of 24. No change in price is indicated up to and including 15 gage. However, from 15 to 24 gage the following price changes result: $1 per net ton for Nos. 16 to 18 gage; $2 for 19 and 20; $4 for 21; $5 for 22; $7 for 23 and $8 for 24 gage and lighter. On No. 10 gage hot-rolled sheets the Empire Steel Corp., Mansfield, O., has established a price of $2.60 per 100 pounds, up $3.50 per ton over present generally existing base of $2.425. Company also is said to have revised extras for pickling and resquaring. No similar price actions have been announced to date by larger mills.

OPA states it will continue priority tonnage directives through first quarter on basis of third-quarter preferred tonnage shipments. In distribution of rated tonnage producers are hopeful that past customer-mill relationships will be taken into account insofar as possible, and careful scrutiny made of requests where it appears applicants have asked for more tonnage than they can possibly use. Should coal strike continue through this week it is doubtful mills will be able to clear up carryover tonnage on books by end of year, further complicating first-quarter delivery schedules that have been established on a tentative basis.

New York — Declining operations in steel as a result of the coal strike, with still further reductions in prospect, has resulted in extra pressure from consumers for sheets. There has been such a stringency over recent weeks, even before the coal strike that various consuming plants have been forced to suspend operations from time to time, pending arrival of steel, and the situation now appears even more unsettled. Various consumers assert that an early shutdown is inevitable provided the soft coal tie up continues, and some already are operating on a reduced basis in an effort to conserve what little steel they have. This is resulting, naturally, in the laying off of employees.

One Ohio producer of hot-dipped galvanized sheets has just eliminated Buffalo as a basing point. It is understood that the governing unit in Buffalo on that product has long since ceased to operate and the action by the Ohio producer is expected to be followed by others. This development, however, has no bearing on the situation in the New York metropolitan area, where Sparrows Point, Md., is the governing base.

Boston — Cold-rolled strip has been advanced to 4.05c, Worcester base, by several producers, an increase of $16 a ton. No. 4 round stock has been raised to 4.55c, Worcester. Base price for these grades has been 3.05c and in some instances drawing extras also have been revised upward. Not all sellers have followed this initial advance, but at least two sellers who are prominent in supplying this area are included. Price for No. 4 edge stock has long been a weak spot and because of the low margin on this finish, production has been steadily curtailed. Backlog orders in flat-rolled are being stringently gleaned of old tonnage, some dating back to the second quarter. As a result, paper backlogs have been rather sharply reduced. Enough tonnage on a firm basis fills first quarter, with February schedules now being assembled. As a matter of fact, some business falls well into second quarter on split orders.

Cincinnati—Sheet mills in this district, as a result of the coal strike, curtailed blast furnace and coking operations, but maintained high levels in rolling last week. Hot metal and gas supplies were thereby reduced. Scrap piles are not adequate for the heavier drain. Full effect of these factors on output of finished tonnage will be had, it was estimated, in two or three weeks. One district interest has revised prices upward, another so far has maintained the old schedule but may have an announcement on new prices soon.

Chicago—As finishing operations are pared down, steelmakers are attempting to spare sheet and strip schedules as much as possible. Object is to minimize loss of output of these sorely needed products which already are leading demand by a large margin. If a rail embargo prohibits shipments of sheets and strip, stockpiling of hot-rolled and aluminum-killed material will be resorted to since this is not feasible for cold-rolled or specially treated material. No price increases have been reported by the larger producers who are not likely to adopt immediately higher prices for galvanized sheets which have been established by smaller mills. Indications are that consumers are accepting reduced 1947 quotas with less complaint than had been expected.

Steel Bars . . .

Consumers increase pressure for bar shipments as coal strike threatens output

Bar Prices, Page 168

New York—In an effort to get in as much tonnage as possible now that the steel industry is sharply curtailing operations as a result of the coal strike, bar consumers are pressing especially hard for tonnage which already in many cases is running behind commitments. However, their efforts are of little avail, for the reduction in steelmaking operations is only complicating the problem of getting tonnage out. Some consumers are in such urgent need for bars that they are being forced to curtail their own operations. A number undoubtedly will be forced to curtail completely in the near future, should the coal strike continue.

First quarter quotas, which have only been established in the past several weeks in various instances, appear to be due either for a reduction, with no responsibility by the mill in seeing that the difference is shipped in the succeeding quarter, or a general pushing back of schedules, which would mean that the undelivered portion in the first quarter would be taken care of in the second quarter. This applies to all sizes of hot-rolled carbon bars and to most sizes of cold-drawn bars as commitments for the first three months have been heavy. In alloy bars the situation is different as bookings have been relatively light with tonnage available at present for shipment in January in hot-rolled alloy bars and February in cold-rolled alloys.

Boston—Postwar demand for alloy bars is below expectations and buying is largely in smaller sizes of cold-finished. Delivery range in carbon bars is wide, depending on size; in bars under one-inch, fabricators are short and pressing for delivery while in the larger sizes, some are crying "uncle" and deferring shipments. This is reflected clearly in delivery schedules for small fastenings which are extended into second quarter on some sizes and grades, while those for larger bolts and nuts are available generally over the normal lead-time. Forge shops, dissatisfied with first quarter carbon bar allotments, are pressing for second quarter coverage with larger volume. Not until January are some producers willing to talk firm schedules for second quarter. Carryover in small sizes is heavy.

Chicago—In reducing operations due to the coal strike, bar mills are seeking to maintain output of small bars at the highest possible level. With demand ranking close behind sheets and strip, the purpose is to minimize the impact after the strike ends. Should a rail embargo be as drastic as anticipated and bar shipments forbidden, mills would stockpile as long as possible. So far, two bar makers are holding schedules but these will be revised as necessity requires. Prices are holding and no adjustments are looked for immediately.

Pittsburgh—Merchant bar mill production schedules soon are expected to be curtailed as result of the coal strike, which would further complicate mill order backlog position in respect to carryover tonnage and first-quarter tentative delivery commitments.

Cold-drawers report adequate inventories to maintain unbalanced operations 4 to 6 weeks. However, due to inadequate storage facilities, cold-finishers output would be adversely affected much sooner should a strict rail embargo be put into effect.

No price adjustments yet have been announced by carbon, alloy or cold-finished bar producers here. However, some significant revision in extra cards are expected, with particular emphasis on chemistry and size extras; also some consideration is being given to rounding out alloy base price quotations.

Cold finishers state new business continues to exceed output, with most interests' order backlogs extended into June and July. Some cold-drawers are concerned over relatively high inventory position of a few customers, and at least one interest is convinced present extended

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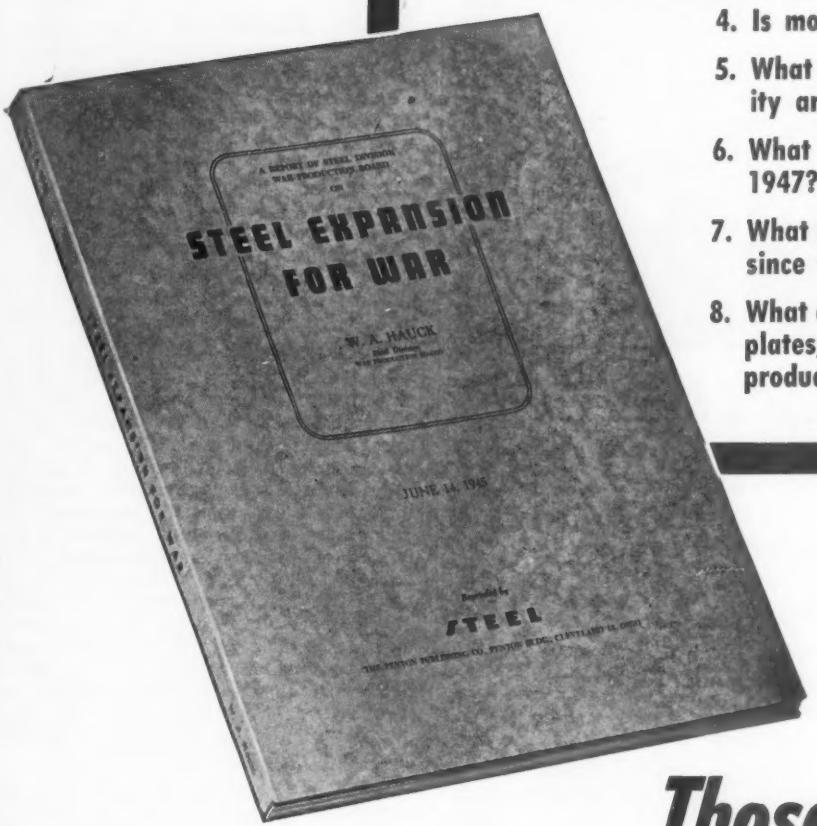

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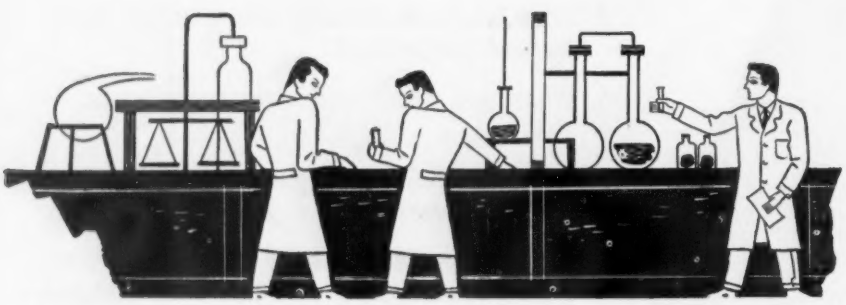

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order backlogs do not represent realistic requirements for first half of next year with result that some adjustment in present order backlogs appears unavoidable.

Philadelphia — Bar mill operations are becoming increasingly disrupted, with producers accepting little or no tonnage in plain carbon steel, although still interested in alloy business. Most sellers are still accepting hot alloy bars for January shipment, and some are even promising cold alloys tonnage for delivery in that month.

Steel Plates . . .

Plate Prices, Page 169

New York—Plate production is shrinking as an indirect result of the coal strike. Another week and the prestrike operations at most eastern plants will be cut 50 per cent, it is estimated. This is resulting in a further increase in backlogs and in the arrearages on current commitments. Demand for light gage plates continues as pressing as ever and in some instances fabricators are having to curtail operations because of lack of steel.

Boston—Fabricating shops are reluctant to take on new contracts requiring substantial new tonnage without assurance of plate deliveries. Mills now are in the second quarter and are struggling to restrain further extension, meeting limited success in some instances. If delivery of the fabricated material is extended enough, orders are closed; 350 tons for a 36-inch plate pipe line, August delivery, is in this category. Considerable plate tonnage is yet to be offered mills for scheduling. This includes tank plate which is in strong demand. Head deliveries in some instances are on an if-and-when basis. Some shops are long on heads and short of plates while the situation is reversed with others.

Seattle — Plates are in strong demand and major projects are to be released soon. Two important awards were made last week. Beall Pipe & Tank Corp., Portland, low at $206,445 will furnish 53,000 ft. of 18-inch steel water pipe for Hillsboro, Oreg., while Thompson Pipe Co., Denver, was awarded 27,500 feet of 24-inch water pipe for Helena, Mont., bidding $107,987, delivery in the spring. Cottage Grove Oreg., will open bids Dec. 2 for 43,000 feet of 14-inch, 8 gage steel water pipe, a unit of a 20-mile supply line project.

Wire . . .

Wire Prices, Page 169

Boston — Low carbon grades of heading wire have been advanced $10 ton. This increase is probably first of several to be expected in some low carbon products. In effort to clear backlogs of deadwood, order books are undergoing drastic screening and by first of year, large volume of old tonnage will be dropped. On this basis, schedules for first two months next quarter are being lined up. Screw and small fastening producers are in need of more tonnage, both rods and finished screw stock. Rods being short, with geographical factors involved, tendency among screw makers is to buy more drawn wire. No relief is in sight for an improved rods supply for non-

integrated mills operating on a hand to mouth basis.

An Ohio producer has announced an increase of 25 cents per 100 pounds to $2.55 for wire rods, No. 5-9/32-inch, inclusive. The corporation also announced an increase of 37½ cents per 100 pounds to $3.42 for bright wire to manufacturers in carloads.

Tin Plate . . .

Tin Plate Prices, Page 169

Pittsburgh — Uncertain level of production costs next year, including basic wage rates and pig tin price, presents a major obstacle for producers in establishing 1947 contract commitments with can manufacturers. Because of these uncertain cost factors, leading interests are expected to wait as long as possible before establishing the 1947 contract price. There is little pressure to get on producers' books for first quarter for under present distribution pattern regular customers are assured their established portion of overall output after making usual allowance for export load.

Continued scarcity of pig tin makes it imperative to extend throughout first quarter the present controls covering public purchases of tin by government agencies plus other controls on the metal. There is considerable pressure for continuation of controls throughout 1947 on tin plate used in output of food containers. CPA estimates production of tin in Far East will not meet unrestricted demands until 1949, due to unprecedented needs and fact that production of pig tin is being resumed relatively slowly.

Curtailment of finishing operations resulting from the coal strike is not expected to adversely affect tin plate output to extent of other finished steel items. During the last coal strike tin plate was least affected of any steel product; however, there is not the urgent need for this item now as was case earlier in the year.

Washington — Production of tin in the Far East is coming back very slowly, Erwin Vogelsang, chief, Tin-Lead-Zinc Branch, Civilian Production Administration, said recently. He pointed out that much economic and social rehabilitation must be accomplished in many previously enemy-occupied areas before production will approach prewar levels. Production is not expected to meet unrestricted demands for tin until 1949. Public purchases of tin, plus other controls over the metal, will continue throughout the first quarter of 1947. The controls which will continue in effect through Mar. 31, 1947, are: (1) Import purchases of tin by the government exclusively; (2) import restrictions on tin contained in order M-63; (3) domestic use and quota controls on tin as administered under the tin order M-43.

Chicago — Feeling is widespread here that if a rail embargo is made effective shipments of steel to tin plate mills will be allowed to maintain can-making operations. Mills are attempting to hold tin plate production as little affected as possible as other operations are curtailed. The car shortage is still critical but probably would improve under regulations.

Tubular Goods . . .

Tubular Goods Prices, Page 169

Seattle — There is a large potential market for cast iron pipe in this area but

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many buyers hesitate to invite bids at present with deliveries 10 to 15 months forward. Agencies can make no promises, being handicapped by low production and transportation difficulties. Tacoma has awarded the general contract for a system expansion, involving 1900 tons cast iron, to Valley Construction Co., Seattle, low bidder at $124,214.

Rails, Cars . . .

Track Material Prices, Page 169

Pittsburgh—Reduced output of plates, shapes and bars, resulting from the coal strike, will further delay badly needed freight car construction. Car builders state this program already is far behind schedule and unless more steel is made available, as now contemplated in form of directive tonnage, 1947 will be a very critical year in the nation's railway transportation system. Lack of steel alone has cost the box car program at least 1000 cars a month, and in addition railroads are said to have been getting only 65 per cent of the 310,000 tons quarterly they need for repairs alone. Despite high level of railroad operating efficiency, current car shortage probably will show little improvement through most of 1947, unless some directive tonnage program is invoked. However, such a move would necessitate taking away badly needed steel for other essential manufacturing programs.

New York — Award of 4250 freight cars and 25 caboose cars by the Chicago, Milwaukee, St. Paul & Pacific to its own shops in Milwaukee, features car buying, which also includes a few awards ranging from 10 to 2000 cars each. New inquiry continues spotty.

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Pig Iron . . .

Banking of blast furnaces and shortage of coke will adversely affect foundries

Pig Iron Prices, Page 171

New York—Some foundries up-state and certain others which have been dependent on by-product coke from eastern Pennsylvania ovens have been advised they will no longer receive shipments for the duration of the coal strike. This is going to force some foundries to close even before they have had a chance to use up such pig iron as they have on hand and may receive. In the immediate New York metropolitan district, by-product coke shipments generally are still being received, as these consumers are dependent largely upon the New Jersey ovens, which so far have been sustaining operations fairly well. However, it appears likely that these shipments will be interrupted shortly.

Meanwhile, shipments of beehive coke, which have been coming through in increasing volume over recent weeks thereby easing the general stringency in this material, are beginning to slow up, so that in the immediate district, as well as in certain other sections, coke may prove to be the first handicap, rather than pig iron, to sustained foundry operations. With the coke supply becoming increasingly critical and with pig iron supplies likely to dwindle soon, since at least three or four blast furnaces which ship pig iron into this district are exepcted to be banked at most any time, the outlook for foundries is deteriorating.

Cincinnati—Many foundries in this district declared long holidays for Thanksgiving, shutting down Wednesday until Monday. The move was to conserve the limited supplies of pig iron, coke and scrap. So far iron shipments have been steady, even though below tonnage sought. The immediate future, of course, is precarious. A West Virginia beehive coke producer sent in an early announcement of a shutdown, due to the coal strike.

Boston—Instead of easing, pig iron shortage will continue this month and relief for New England melters will be postponed. Resumption of blast by the Mystic furnace at Everett, Mass, has been delayed and output curtailed at other furnaces which have been carrying bulk of the load for this area. The latter units will actually have less iron to distribute in December. Rated volume will be fully as heavy as in November and production schedules are uncertain for the last month of the year. Melt is restricted for lack of iron and castings rejects are substantially above normal, due mainly to makeshifts in melting mixtures.

Chicago — With supplies of pig iron and coke being reduced and more drastic reduction yet to come, and with prospects of the rail embargo barring shipments of pig iron, foundries are pushing

for every pound of production they can get. Inventories of raw materials are too low to support schedules long. The feeling is that shutdowns will come quickly and be complete. By last weekend at least 10 and possibly as many as 13 of the district's blast furnaces would be banked. Ten days ago 34 were operating. Among the first to be banked were stacks producing merchant iron. Metallurgical coke producers are increasing coking time, reducing yield, and shipments to customers are being cut.

Pittsburgh—Pig iron output was curtailed sharply last week due to the coal strike, with U. S. Steel Corp.'s subsidaries banking 12 and glowing out two units for repairs, while Jones & Laughlin Steel Corp. banked one furnace at its Pittsburgh Works and two at Aliquippa. At week end 40 out of 54 units were pouring iron, with indications of further sharp reduction in operations should the strike continue. The lone merchant pig iron producer expects to maintain full operations for another two weeks, but this will not be of much aid to foundries should a freight embargo become operative.

Shortage of coke, however, is expected to adversely affect foundry operations sooner than lack of pig iron.

Extention of pig iron allocations for housing program through first quarter still is undecided, but considered probable for the program already has been approved on finished steel items. The pig iron premium payment plan remains operative, but amount paid under this program will be reviewed when the industry announces expected upward price revision.

E. & G. Brooke Iron Co., Birdsboro, Pa., increased prices $2 a ton recently.

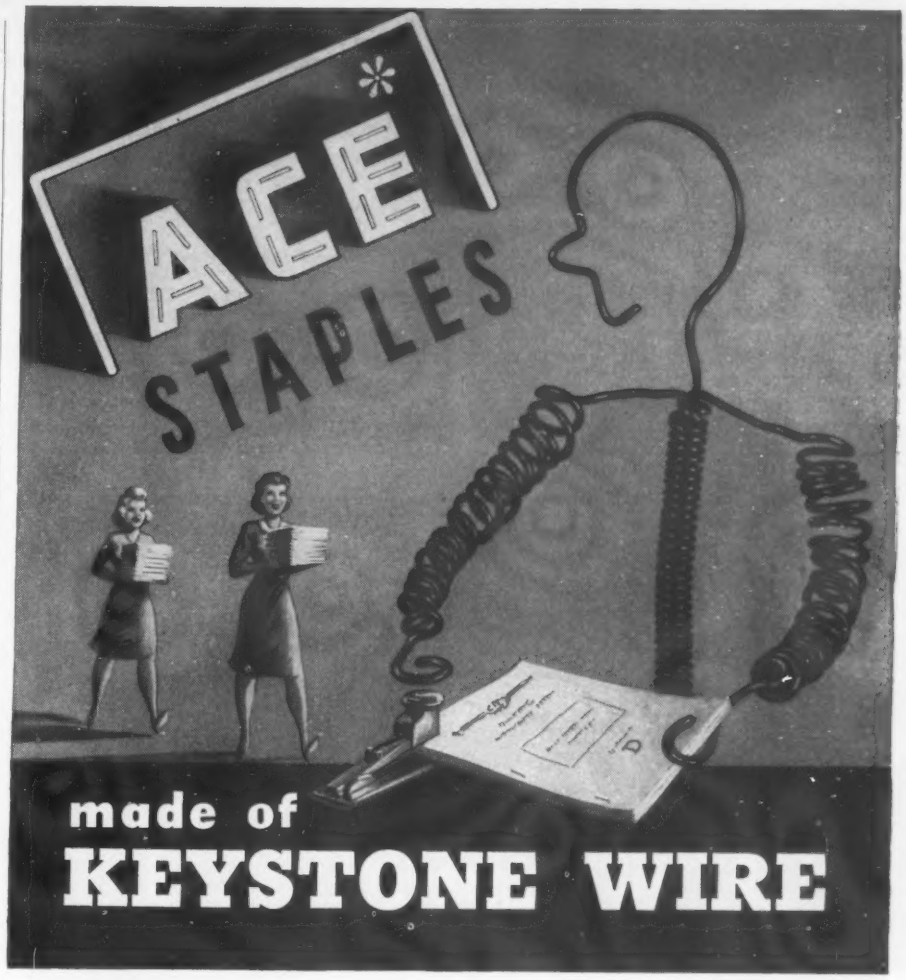
Pittsburgh Coke & Chemical Co. has advanced prices $2 a ton, effective Dec. 1, on all grades of pig iron.

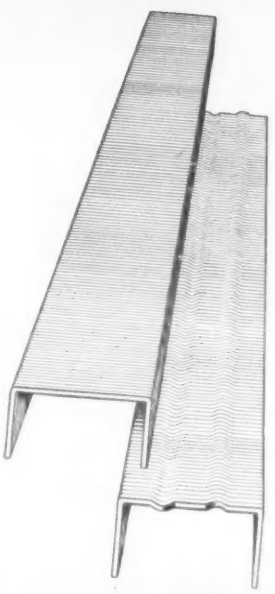
Buffalo—Confusion gripped the pig iron trade last week as producers were unable to map future production schedules because of the miners' walkout. Blast furnace operations tumbled to 75 per cent of capacity as the coal strike forced a leading mill to bank two more units, making a total of three. All were on basic.

Adding to the unsettlement in merchant iron is the continued speculation that a last minute change might be pending in prices on next month's deliveries. Sellers withheld any promises on price or time of shipments. New contracts still included the protective clause that shipments will be made at the "seller's price at time of shipments." A further sharp falling off was noted in pressure for deliveries to consumers. This was reported by both merchant iron and coke suppliers.

Philadelphia—With various blast furnaces going down, including the Birdsboro, Pa., stack, stringency in pig iron is acute. And even more acute, particularly insofar as it affects the foundries, is the dearth of metallurgical coke. Shortly after miners walked out, the largest by-product producer in the district suspended all outside shipments, and within the past week, another took practically the same action. Thus, various foundries are having to curtail drastically and in some cases suspend entirely, first and primarily because of coke.

If the present coal tieup runs on much longer even certified consumers of pig iron and coke will get little ma-





Precision wire is used in making Ace Staples. Essential requirements are high finish, close diameter and uniform temper to match the high degree of tooling and craftsmanship required to produce these staples.

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terial over the remainder of the year. In fact, at the moment the whole system of certifications appears threatened.

There is much speculation as to the future of the housing program. Should it collapse, subsidies to pig iron producers would be jeopardized. So far pig iron sellers generally have not followed the lead of the Birdsboro, Pa., producer in advancing prices $2 a ton, and now that the miners have struck and furnaces are suspending operations on a broad scale, there is little promise that they will. Rather, they may wait to see what happens to coal prices and also to the subsidies, before they take any price action whatsoever. However, should coal prices go up and subsidies pass out, some trade leaders would not be surprised to see prices advance $8 or more a ton. The $2 advance by Birdsboro was admittedly a move to balance selling prices with the higher costs as of that time and not to anticipate future increases in expense.

Structural Shapes . . .

Structural Shape Prices, Page 169

New York — While expecting an early reduction in flow of shipments from the shape mills, district fabricators say they have enough material on hand to sustain operations for at least two or three weeks without major hindrance. Meanwhile, there are few outstanding structural orders and relatively few new inquiries, builders apparently marking time awaiting developments in the coal strike.

Seattle — Fabricating plants using shapes and plates are operating below capacity due to lack of steel. Some deliveries are coming from the East by rail and much material is still stymied aboard strike-bound vessels. Many new projects are being delayed as it is useless to call for bids on large tonnages in the circumstances. Shapes pending include unstated tonnages for telephone exchange additions at Portland and Klamath Falls, Oreg., 275-foot towers for Fort Peck, Montana, an 80-foot bridge for Yakima county, Wash., and a 140-foot deck girder span for the Seward highway, Alaska.

Scrap . . .

No embargo expected on scrap shipments during coal strike . . . Prices firm

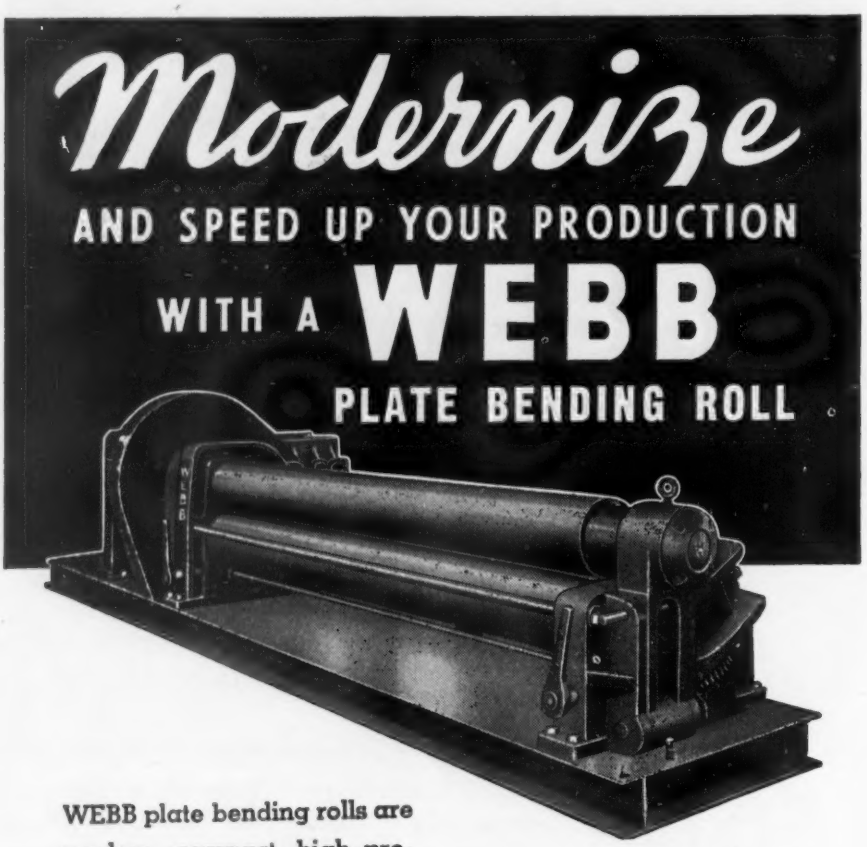
Scrap Prices, Page 172

Pittsburgh—Sharp reduction in steel mill production schedules has eased, at least temporarily, the acute demand for scrap. Mills expect to build up scrap inventories somewhat during this period of reduced operations, for in addition to the sharp drop in immediate requirements, the flow of scrap to mills' yards has recorded a slight improvement in recent weeks. Brokers say automotive scrap lists have been substantially larger recently, citing an example the latest list of Fisher Body which included 21 cars of low phos and about 150 cars of bundles. Demand for cast scrap has grown more acute as a result of the threatened reduction in merchant pig iron supply due to the coal strike. However, no large tonnage sales at more than $9 per ton above former OPA ceilings have been noted for No. 1 cupola cast.

Cincinnati — Dealers and brokers scoured sources for open hearth scrap grades as demand soared in response to blast furnace curtailments. Cast, as heretofore, commanded premium prices. The entire scrap market remained steady, in realization that supplies were below demand, in the face of the uncertainties created by the mine shutdowns. A slight bulge in available tonnage was noted in the last two weeks.

Chicago — Following a brief flurry early last week when open-hearth scrap rose to $25 a ton, the price has settled back to $23.75, or $5 above old ceilings with mills offers pegged at this level. Borings and turnings range between $2.50 and $3 over former ceilings. No. 1 heavy melting railroad steel is holding at $24.75, up $5 above the old ceiling but prices of other railroad grades are difficult to determine yet. Cast scrap offerings bring $30 to $40 from foundries. Demand for scrap remains strong despite the coal strike but the flow of material is only fair. It is believed considerable tonnage is being held for higher prices.

Detroit — Prices are holding steadily at the $5 increase in open-hearth and electric furnace grades. General Motors plants have apparently indicated their willingness to go along with the so-called "formula" in determining differentials



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and Fisher Body has up for bids a list of some 238 cars of bundles and a smaller amount of punchings. This is the first appearance of a Fisher Body list for open bidding and is somewhat smaller than normal prewar monthly lists, probably because channeled orders made before decontrol are being filled.

Signs of resistance to sharply higher prices on case grades are appearing, possibly because some foundries are overbought and because the imminent possibility of a coke shortage resulting from the coal strike. Price spread on cast material is narrowed to $2 per ton, with No. 1 cupola cast quoted at $35-$37 and heavy breakable $28-$30.

Philadelphia — Consumers of heavy melting steel are still paying around $5 a ton more than they did under OPA ceilings and as long as the coal strike continues there may be no great change. However, there is a strong undertone, with dealers here and there picking up choice lots for shipment to their yards at prices above what consumers generally now are having to pay and these higher prices, it is contended, should be reflected later, when steel operating conditions become more normal, in higher prices to consumers. At least this buying for yards reflects long term bullishness on the part of dealers thus engaged, which may or may not be warranted.

Meanwhile, No. 1 and No. 2 melting, No. 1 busheling and No. 1 and No. 2 bundles are holding at $23.75-$24.25, delivered consumer's plant. This is unchanged from a week ago, although at the time through error in transcription these grades appeared in STEEL's price tables at $2 under the going market.

Prices on leading cast grades are definitely higher, with No. 1 cupola cast now holding at $38-$40, delivered, with the market nearer the outside figure; charging box cast and heavy breakable cast, and unstripped motor blocks, $35-$36. Some of the smaller consumers of cast, who buy perhaps a carload a month or so, have paid even higher than these prices. No. 1 chemical borings are higher at $22.75-$23.25, delivered.

In general, the scrap situation is unsettled, with possible freight embargoes shortly, should the coal strike continue, likely to have a still more unsettling effect. However, the movement of scrap over the past week was improved.

New York—While there has been increasing demand for scrap to offset dwindling supplies of pig iron, there has been little further change in scrap prices. This is particularly true of melting steel. The cast grades are more buoyant, with some small purchases here and there reported as going at higher levels than a few days ago; nevertheless, the larger consumers of these grades are still holding at current levels and apparently are receiving a reasonable amount of tonnage.

Market Banking

Buffalo—Unless enforced by the railroads, no embargo on scrap shipments is expected during the miners walkout. Dealers are of the opinion that mills will continue to take deliveries because of the serious scrap shortage which still threatens future ingot operations.

Hesitancy and a lull in fresh buying interest meet with mixed reactions among dealers. While some look upon the lull as a possible forerunner of easier prices, others point out that substantial orders were placed after lifting of controls with a technical dip in buying interest expected. Prices remain the same with considerable uncertainty over labor disputes again hanging over the market.

Boston — Although steel making grades are becoming more stabilized as to price on basis of $20.35, shipping point, cast and specialty scrap is still hampered by price confusion. Most consumers being low on scrap, there are few holdups in shipments, but up to now price uncertainty has been contributing factor in slowing up material. Considerable yard stock is still off the market and industrial scrap is retarded by uncertain price considerations. High ratio of scrap in melts will continue longer than expected due to failure of pig iron supply to improve this month to degree expected.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 169

Pittsburgh — Major producers have not yet taken action on contemplated revision of concrete reinforcing bar price schedules, although such action is said to be necessary because of present unfavorable price relationship with merchant carbon bars. Due to this price disparity, production of reinforcing bars has been sidetracked in recent months in preference to carbon bars with result present concrete bar order backlogs are extended well into next year and many

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construction programs have been held up. A number of projects also have been temporarily shelved due to uncertain future price structure on concrete bars and inability of mills to make definite delivery commitments. Sellers indicate some consideration is being given proposal to eliminate present $5 per ton discount to jobbers and fabricators, at the same time raising the extra from $5 to $10 per ton for fabricated concrete bars. Ploduction of concrete bars soon is expected to be curtailed as result of the coal strike.

Advance in Nickel Prices Is First Change Since 1929; Nickel Oxide Sinter Offered

NICKEL prices advanced about 3½ cents per pound, effective as of Nov. 25. This was the first change in base prices since Jan. 1, 1929, when the market eased 2 cents a pound.

Contract price for 99.9 per cent electrolytic nickel from the Port Colborne, Ont., refinery advanced to 35.00c a pound, the published spot price previously obtaining. The new price includes the existing 2.5 cents United States import duty. The price to general warehouse distributors of nickel will make corresponding increases in their prices for deliveries out of warehouse. Comparable price increases also have been made for the company's nickel alloy mill products, such as rods, bars and sheets of monel, inconel and pure nickel.

Robert C. Stanley, president, International Nickel Co. Inc., said the increase in its United States prices would bring them into line with those prevailing in the world market, or £190 per long ton in London.

The increases have been necessary, Mr. Stanley said, in order partially to offset substantial cost increases during recent years in the operations of mining, smelting, and refining of nickel at the company's plants.

A new product, nickel oxide sinter, was announced and will be offered for use in the manufacture of alloy steels and stainless steels, A new plant for the production of the sinter is being built at Copper Cliff, Ont., and if construction is not delayed by shortages of material and equipment, it is expected this plant may be completed and in operation during 1947.

War Assets Administration's entire inventory of surplus nonferrous metals, originally costing about $100 million, is being offered on a competitive bid basis. Previously, the metals were offered at fixed prices in accordance with OPA ceilings. Among the metals affected are: Copper, lead, tin and zinc and all their alloys, in all shapes and forms. A certain amount of surplus aluminum and magnesium is being reserved from this action because the market in these commodities has been stabilized. Scrap and such other raw materials included in the CPA declaration of civilian deficiency will continue to be sold on sealed bids, in accordance with directive 15 to PR-13.

Copper — Price for domestic copper was established at 19.50c, Connecticut valley, by all selllrs last week. Demand remains considerably in excess of supply from domestic and from current imports of foreign metal. There is little, if any, nearby metal available for sale for immediate delivery.

Lead — Domestic lead price held unchanged at 11.65c, East St. Louis. Increased amounts of secondary lead have been authorized by CPA for replacement storage batteries, lead chemicals and cable coverings. For storage batteries the amount is increased 6 per cent; for cable covering, 2 per cent; and lead chemicals, 10 per cent. The increased lead was limited to replacement batteries, as sufficient lead is believed already allowed for batteries used in new equipment.

Zinc — Prime western zinc continued at 10.50c, East St. Louis, last week while foreign zinc was again quoted at 11.00c a pound at Gulf of Mexico ports.

Premium for special high grade zinc has been increased ¼-cent a pound to 1¼ cents a pound. Heretofore, both high grade and special high grade zinc carried a premium of 1 cent a pound over the price of prime western. The increase is designed to make more special high grade available to the casting industry.

Tin—Controls over tin will continue throughout the first quarter of 1947 because these controls appear to offer the best plan to distribute the metal equitably in the face of continued scarcity, CPA said recently. These controls include: (1) Import purchase of tin by the government exclusively; (2) import restrictions on tin as contained in order M-63; (3) domestic use and quota controls on tin as administered under M-43.

Production of tin in the Far East is coming back very slowly. Much economic and social rehabilitation must be accomplished in many previously enemy-occupied areas before production will approach prewar levels. CPA estimates that production will not meet unrestricted demands for tin until 1949.

The domestic market held unchanged at 70.00c, New York, last week.

Metallurgical Coke . . .

Coke Prices, Page 169

Pittsburgh — All beehive coke ovens have been banked and by-product operations sharply curtailed due to the coal strike. Independent by-product coke operators had about 20 days' supply of coal on hand at start of the strike, while stocks at integrated steel producers' plants averaged about two weeks' supply. At U. S. Steel Corp.'s Clairton plant, stocks represented but 8 days' supply, with result operations were curtailed almost immediately following the mine walk-out. Merchant blast furnace interest here has partially withdrawn from the market on its coke sales in effort to conserve coal for its own operation. This interest had about 30 days' coal supply at start of strike and to date has not curtailed iron output. Some foundries already have had to reduce operations due to depleted coke stocks, and should coal strike continue some will have to shut down this week.

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Warehouse . . .

Warehouse Prices, Page 170

Pittsburgh — Substantial reduction in mill shipments to steel distributors is expected as result of coal strike adversely affecting finished steel output. Warehouse stocks of plates, shapes and most wire items are nearly depleted. Inventories of sheets and bars are somewhat larger but still well below normal, while tubing items are said to be in fair shape. On basis of reduction in mill steel shipments through December, warehouse interests are putting into effect a more drastic allocation system to regular customers. Distributors have been forced to lay off some of their personnel because of depleted inventory position, which in some instances is lowest on record. No revision in warehouse steel prices has yet been announced, although serious consideration is being given to re-establishment of the normal relationship between steel mill and warehouse price quotations.

Chicago — Warehouses are feeling the effect of the coal strike and its resulting curtailment of steel production. Consumers are seeking material to keep factories running as long as possible. Fearing a rail embargo, mills are shipping available material with all speed. If an embargo halts the flow of steel to distributors, inventories will be exhausted quickly for consumers will redouble efforts to acquire spot material.

Philadelphia — While there have been some scattered and miscellaneous increases by certain of the smaller independent mills, leading jobbers in this district are still quoting at recent OPA levels. Meanwhile, declining operations at producers' plants as a result of the coal strike have placed still greater pressure on distributors, with stocks becoming more unbalanced. However, should the tieup at the mines be prolonged, manufacturing operations will become increasingly disrupted, thus possibly checking the current trend.

Semifinished Steel . . .

Semifinished Prices, Page 168

Pittsburgh — Shipments of wire rods, billets, forging ingots and other semifinished steel items to nonintegrated steel interests have been sharply reduced as result of the coal strike. Integrated steel mills had only limited semifinished steel inventory on hand at start of the strike with result that the reduced tonnage of steel now produced is channeled into their own finishing operations. Nonintegrated steel producers soon are expected to curtail production schedules for their stocks of semifinished steel were well below normal even prior to the coal strike. No price action has been announced by major interests of semifinished items since OPA decontrol. However, it is assumed that the nonintegrated sheet mills sold in recent months were concluded on the basis of a definite commitment from integrated mills to furnish sheet bar requirements presumably at well above the present level of $38 per gross ton.

Ferroalloys . . .

Ferroalloy Prices, Page 171

New York — While as noted in last week's issue, the eastern producer of

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spiegeleisen, 19-21 per cent, has advanced prices $4 a ton to $40 Palmerton, Pa., the principal midwestern seller has taken no action, still quoting $40.50, Pittsburgh, and $40.60 Chicago.

On ferromanganese no changes have yet been made. As noted last week, one seller is now entering first quarter contracts at unchanged prices, while certain others are entering contracts for only January at present levels. These latter interests are expected to move throughout the first quarter on a month-to-month basis so as to take advantage of a price rise in the event they believe it is warranted. One large producer has taken no action of any kind at this time and may not before the middle of next month.

Prices on other manganese alloys, the only major products in the ferroalloy field to be held under control until OPA's decontrolling action early in the month, remain unchanged so far. However, it would not prove surprising if advances were made a little later.

Canada . . .

Toronto, Ont. — While there has been comparatively little easing in the steel and pig iron supply in Canada, deliveries are being speeded up with the big basic steel producers now back almost to normal operating schedules. While some units still are undergoing repairs, steel and pig iron production rates are about 70 and 65 per cent, respectively, and should show a gain of another few points before the yearend. However, the soft coal strike in the United States may throw another monkey-wrench into the works, as coal supplies at Algoma Steel Corp., and the Steel Co. of Canada are somewhat below normal for this season as a result of curtailed deliveries during the steel strike here which shut out deliveries of raw materials to the Canadian steel mills.

While some Canadian steel producers are out of the market and not accepting additional orders at this time, others are booking business but make no promise of delivery. All producers are booked solid on bars, sheets and plate to the end of first quarter although these units are operating close to capacity. The loss of upwards of 400,000 tons of steel during the 81-day strike at Canadian mills will require several months to replace and it is not expected that producers will start to catch up with orders until the middle of next year.

Improvement in steel deliveries, however, is reflected in increased operations by many industrial plants and companies that had to lay off workers now are beginning to take on more men. Ford Motor Co. of Canada, Windsor, is an exception and announced that 2400 workers were laid off as of Nov. 21, due to shortages of raw materials and especially sheet steel.

Steel wire production fell off sharply in September as a result of the coal strike, when plain wire production dropped to 3548 tons from 4,017 tons in August and 11,092 tons in July, and this rate was only about half that of the average for the first half of this year. Nail production also was sharply reduced in the strike period, dropping to about 50 per cent of normal. However, nail production now is moving ahead and most plants again are on production.

Canadian companies again are seeking business in the export markets and recently have been successful in closing good contracts for shipbuilding. Yarrows Limited, Esquimalt, B. C., recently taken over by Burrard Dry Docks Ltd., has received an order from the French government for the building of four 177 lighthouse tenders at a cost of $2,750,000, and there are favorable possibilities that British Columbia builders will share in orders from China, which is said to be negotiating for three cargo vessels to cost about $6 million. Davie Shipbuilding & Repair Co., Lauzon, Que., has received an order from the French government for 12 freighters, including four of 7200 tons; three of 5300 tons and five of 4850 tons.

British Columbia Power Corp., Vancouver, has awarded contract for 62,000 horsepower generating unit for its Bridge River power project to cost $847,000. Of this total about $500,000 goes to Vancouver Engineering Works Ltd., which will build and assemble most of the turbines from designs by Pelton Waterwheel Co., San Francisco, while Canadian Westinghouse Co. has an order for a 50,000 kva generator. This unit will be the first of 10 to be incorporated in the Bridge River project and will be the largest of its type ever built for use in North America.

D. M. Hogarth, president of Steep Rock Iron Mines, stated that the new program of development is expected to put the mine on a 3 million ton a year basis. To put the "A" orebody in shape for mining will be a two-year job and in the meantime production is planned to proceed at about 1 million tons yearly from the "B" orebody.

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Two Eastern Mills Revise Finished Steel Prices

Phoenix Iron Co., Phoenixville, Pa., has advanced all shapes to 3.05c, Bethlehem, Pa., equivalent. This is an increase of $7 a ton on the general range and $5 on beams and channels from 4 to 10 inches. These products had previously been marked up $2 a ton.

Stanley Works, New Britain, Conn., has advanced hot-rolled strip, wider than six inches, to 2.80c, Pittsburgh, and narrower than six inches, to 2.90c, Pittsburgh; cold-rolled strip, 0.25 carbon and under, to 3.55c, Pittsburgh and 3.75c, Worcester, Mass. Hot-rolled spring steel 0.25 to 0.56 carbon has been increased to 3.55c, Pittsburgh and 3.75c, Worcester. Cold-rolled spring steel, 0.51 to 0.75 carbon, has been increased to 4.80c Pittsburgh, 5.00c Worcester; 0.76 to 100, 6.65c Pittsburgh, and 6.85c Worcester, and over 100 carbon, 8.85c, Pittsburgh and 9.05c Worcester.

These revisions represent an increase of $9 on the strip and more than $9 on the spring steel.

Further, this company has announced that any of its hot-rolled products, falling within the sheet, plate or bar classifications, will be advanced 45 cents per hundred pounds, and any cold rolled products falling within these classifications, 50 cents per hundred pounds. At present, no change is being made in the base prices on hot or cold alloy steels.

Strike Causes Industrial Activity To Drop Rapidly

(*Continued from Page 77*)

idled. Many fabricators in the district took a long holiday, suspending operations from Wednesday until Monday, Dec. 2, as a coal and steel conservation move.

Eastern Producers Curtail

PHILADELPHIA — Ingot operations in this territory have been hit sharply by the coal strike, the rate last week averaging 58 per cent of capacity, drop of 12 points. Further reductions are anticipated this week.

With steel operations dropping, curtailments also are underway in metalworking plants. Freight embargo as a coal conservation measure is anticipated by some interests in the district.

Drop Severe at Pittsburgh

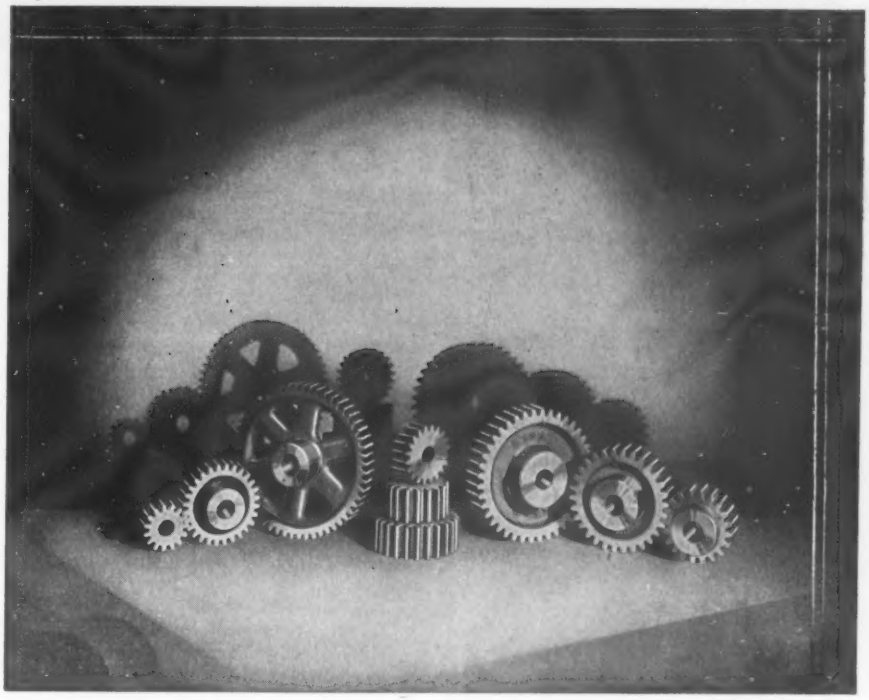
PITTSBURGH — Reduction in the Pittsburgh district's steel ingot operations to about 57 per cent of capacity, compared with 98 per cent in preceding week, has been forced by the coal strike and further curtailment in production schedules is indicated should the strike continue.

Output at Carnegie Steel Corp.'s Clairton byproduct coke works has been reduced to 38 per cent of capacity, while all U. S. Steel Corp's beehive ovens in the district have been banked. Byproduct coke production has been reduced 15 per cent by Pittsburgh Steel Co., while Jones & Laughlin Steel Corp. has cut coke output 50 per cent at Aliquippa works and about 25 per cent at Pittsburgh.

Carnegie has curtailed primary steel operations to 35 per cent of capacity here and National Tube Co. to 50 per cent. A total of 16 out of 28 blast furnaces normally operated by these two U. S. Steel subsidiaries have been banked. Jones & Laughlin Steel Corp. has banked three blast furnaces and its steel ingot output was reduced one-third last week to about 63 per cent.

Finished steel output also has been affected. Seamless tube production at National Tube Co.'s plant, for example, has been cut 50 per cent. Semifinished steel stocks were below normal at the start of the strike and it is believed probable further substantial curtailment in output of shapes, plates, bars and wire items will be put into effect this week.

Mills are expected to channel the bulk of available raw steel output into production of sheets and tin plate, but even in this latter instance operations will have to be reduced sooner than now



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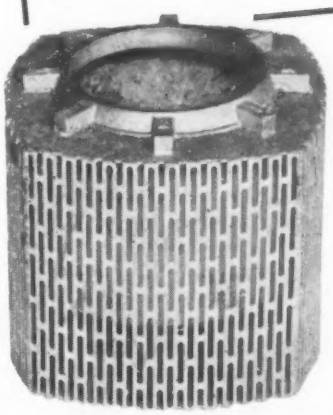

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VERTICAL TURBINE PUMPS

indicated, if not excluded, from threatened rail freight embargo.

Sharp curtailment in metalworking operations also is expected due to the shortage of coal, and indicated sharp reduction in finished steel shipments from mills, but more particularly because of a probable freight embargo. The Tri-State Industrial Association, representing 131 companies which employ 200,000 workers in the area, estimates production must be cut 50 per cent within two weeks if the strike continues. Curtailment in steel operations to date has idled about 25,000 steelworkers here.

Frozen coal reserves are shrinking fast, estimated at less than 100,000 tons for this district at last week end. However, there is some coal production in the area, estimated at nearly 23,000 tons daily from 55 small mines and strip operations.

Operations Cut in Detroit

DETROIT — Steelmaking operations in this area declined five points last week to 84 per cent of capacity, the drop resulting partially from a cutback in Ford open-hearth production, presumably attributable to coal-coke conservation measures.

Supplies of coal at steel mills and utilities in this area are ranging from 24 days to three months or more. However, foundry coke supplies are limited, with larger foundries having only a week to 14 days' supply.

Merchant Iron Output Reduced

BUFFALO—National Steel Corp. reduced merchant pig iron production 25 per cent at the local plant of its subsidiary, Hanna Furnace Corp. An additional 25 per cent reduction is planned within a few days. Four blast furnaces usually are operated at Buffalo. National Steel's plants at Weirton, W. Va., and those of a subsidiary at Detroit, operated normally last week.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, high-level bridge, Connecticut river, Saybrook-Lyme, Conn.

700 tons, car fabricating shop, DeSoto, Mo., for Missouri Pacific Railroad, to Bethlehem Steel Co., Bethlehem, Pa.

575 tons, building addition, plant 14, Pittsfield, Mass., to Lehigh Structural Steel Co., Allentown, Pa.

235 tons, diesel shop, Boston & Maine railroad, Somerville, Mass., to American Bridge Co., Pittsburgh.

200 tons, generator support, Connecticut Light & Power Co., Montville, Conn., to American Bridge Co., Pittsburgh.

125 tons, addition to children's hospital, Boston, to Lehigh Structural Steel Co., Allentown, Pa.

115 tons, building, General Foods Corp., Woburn, Mass.

STRUCTURAL STEEL PENDING

2100 tons, power house, Toledo, O., for Toledo Edison Co.

150 tons, machine shop, Kidder Press Co., Dover, N. H.

105 tons, warehouse, Atlantic Gelatin Co., Woburn, Mass.

Unstated, exchange building additions for Pacific Telephone & Telegraph Co., at Portland, $212,000 project; at Klamath Falls, Oregon, $101,000 project; approved by district CPA; bids in near future.

Unstated, 275-foot steel surge towers for Fort Peck, Montana, power project; construction in early 1947.

Unstated, 140-foot steel deck, girder spans, Seward highway, Alaska; preliminary notice issued by Public Roads Administration, Juneau, Alaska.

Unstated, 80-foot, wide flange beam span, Yakima county, Wash.; bids Dec. 6; previous bids rejected.; O. E. Brashears, county engineer.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2750 tons, South Side intercepting sewer, Contract No. 2, Chicago, for Sanitary District of Chicago, to Carnegie-Illinois Steel Corp., Chicago; S. A. Healy Co., Chicago, contractor; bids Sept. 12.

PLATES . . .

PLATES PLACED

1000 tons or more, 53,000 feet, 18-inch steel water pipe and couplings, for Hillsboro, Oreg., awarded to Beall Tank & Pipe Corp., Portland, low bid $206,445.

500 tons or more, 27,500 feet, 24-inch steel water pipe for Helena, Mont., to Thompson Pipe Co., Denver, low bid $107,987.

135 tons, siphon, Metropolitan District commission, Boston, to Walsh Holyoke Boiler Works, Holyoke, Mass.; installation at Northboro, Mass.

PLATES PENDING

Unstated, 43,000 ft., 14-inch, 8 gage or thicker, steel water pipe; bids to L. W. Coiner, city engineer, Cottage Grove, Oreg., Dec. 2.

PIPE . . .

CAST IRON PIPE PLACED

1900 tons, Tacoma, Wash., improvement; general contract to Valley Construction Co., Seattle, low at $124,214.

RAILS, CARS . . .

RAILROAD CARS PLACED

American Refrigerator Transit Co., 2000 forty-ton refrigerator cars, 900 going to Pullman-Standard Car Mfg. Co., Chicago, 900 to General American Transportation Corp., Chicago and 200 to the DeSoto, Mo., shops of Missouri Pacific, one of the joint owners of the American Refrigerator Transit Co.

Chesapeake & Ohio, 10 box cars, to its shops at Russell, Ky.

Chicago, Milwaukee, St. Paul & Pacific, 4250 freight cars and 25 caboose cars, to its own shops at Milwaukee; freight car list includes 2000 fifty-ton gondolas, 1600 fifty-ton box cars, 500 fifty-ton hopper cars and 150 seventy-ton covered hopper cars.

Louisville & Nashville, 300 fifty-ton flat cars, to Greenville Steel Car Co., Greenville, Pa.

Norfolk Southern, 250 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Railway Express Agency, 500 high-speed refrigerator cars, to American Car & Foundry Co. to be built at Chicago shops.

Seaboard Air Line, 150 seventy-ton covered hoppers, to Bethlehem Steel Co., Bethlehem, Pa.

Virginian, 500 fifty-ton hopper car bodies, to be built at company shops at Princeton, W. Va., and placed on trucks reclaimed from old cars.

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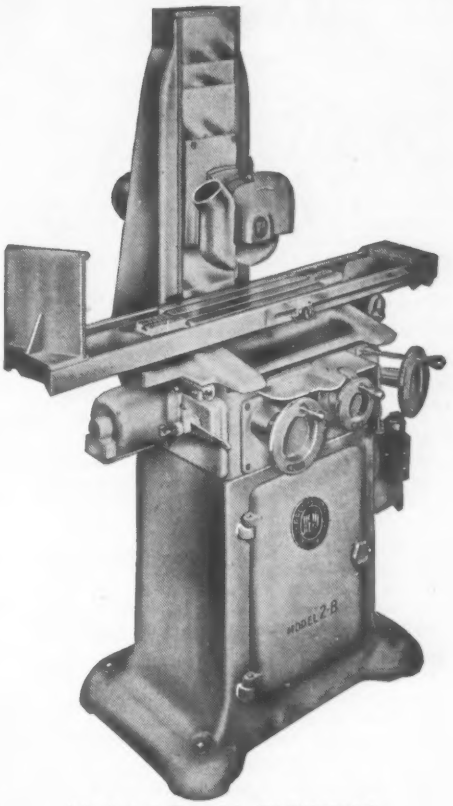

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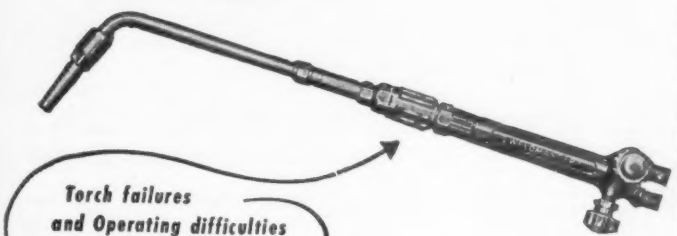

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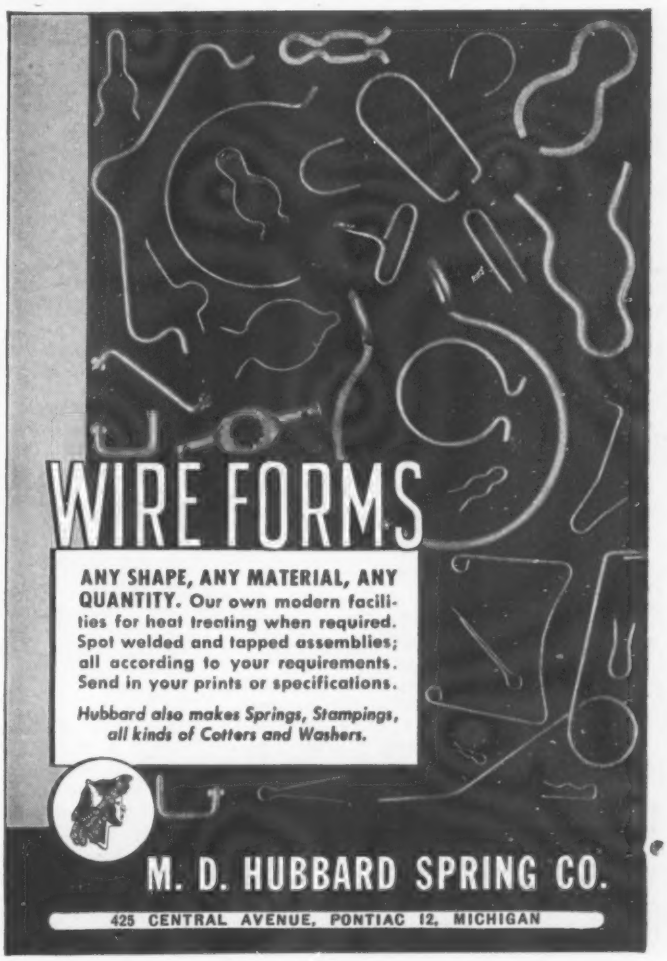

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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

ALAMEDA, CALIF.—Kieckhefer Container Co., c/o H. D. Harris, Pacific Coast manager, 2 Pine St., San Francisco, has awarded contract for factory section to Cahill Bros., 206 Sansome St., San Francisco, at an estimated cost of over $500,000. W. W. Oeflein Inc., 5345 N. Hopkins St., Milwaukee, is engineer.

EMERYVILLE, CALIF.—Caine Steel Co., 3110 Adeline St., Oakland, Calif., has awarded contract for design and construction of one-story warehouse and office to Empire Construction Co. Ltd., 344 Harriet St., San Francisco, to cost an estimated $100,000.

LOS ANGELES—Washington Copper Co. has completed plans for construction of warehouse addition at Washington Blvd. and Budlong St., to contain 3500 sq ft of space. Cost is undisclosed.

MOUNTAIN VIEW, CALIF.—Stauffer Chemical Co., 636 California St., San Francisco, has asked for bids for one-story laboratory, to cost $100,000. K. Theill, 580 Market St., San Francisco, is the engineer.

RIVERSIDE, CALIF.—Hunter Douglas Corp. has awarded contract for ten 75 x 250-ft factory buildings to own forces for over $500,000. Bowen, Rowe, Rule & Bowen, 2835 Gilroy St., Los Angeles, are engineers.

SAN CARLOS, CALIF.—Lenkurt Electric Co., 1138 Howard St., San Francisco, has awarded contract for one-story, 100 x 200-ft factory to Soule Steel Co., 1750 Army St., San Francisco, for an estimated $60,000.

TORRANCE, CALIF.—American Radiator & Standard Sanitary Corp. has received CPA approval for construction of $2,530,000 factory at Crenshaw Blvd. and 203rd St., for manufacture of bathroom and other sanitary equipment.

WILMINGTON, CALIF.—Los Angeles Department of Water & Power, Los Angeles, has received CPA approval for construction of a $4 million electric power generating plant at Island Ave. and B St.

ILLINOIS

FRANKLIN PARK, ILL.—National Metal Products, 9301 W. Belmont, has awarded contract for one-story, 110 x 220-ft factory, and 30 x 100-ft office to Leuthesser Bros., same address, for an estimated $150,000.

INDIANA

INDIANAPOLIS—Indus Tool & Mfg. Corp., 431 N. Holmes Ave., has been incorporated with 1000 shares of no par value stock to manufacture tools, dies and other equipment by Ralph T., Marie and Harry T. Carrico.

INDIANAPOLIS—National Malleable & Steel Castings Co. is planning a $2 million mechanization and modernization program at its local plant. A new building containing approximately 25,000 square feet of floor space is to be constructed, and new machinery and equipment will be installed.

IOWA

BURLINGTON, IOWA—Kimble Electric Division, Miehle Printing & Mfg. Co., 2011 W. Hastings St., Chicago, has awarded general contract for one-story, 200 x 250-ft factory and one-story, 30 x 100-ft office section to W. A. Hattson, Burlington. Contract for plumbing and heating was awarded to Mechanical Construction Co., Burlington. D. D. Morgan, 218 Farmers & Merchants Bank Bldg., is architect.

MISSOURI

ST. LOUIS—Advance Oven Co., 700 S. 18th St., has received lowest bid for 100 x 160-ft factory, 4507 N. Broadway, from S. W. Drake, 3820 N. Broadway. H. Julian Vernon, 3407½ S. Jefferson Ave., is architect.

ST. LOUIS—Monsanto Chemical Co., 1700 S. Second St., has let contract for chemical plant additions, 2021 Kosciusko St., mezzanine floor addition, 137 W. Russell Ave., and steel gratings, steel plate and sprinklers in building, 153 W. Russell Ave., to Fruin-Colman Construction Co., 1706 W. Olive St. Contracts are for approximately $120,000.

OHIO

CLEVELAND—Harshaw Chemical Co., 1945 E. 97th St., plans to start erection soon of an adjoining three-story, $150,000 office building and laboratory for its scientific division.

CLEVELAND—Westinghouse Electric Corp., 1216 W. 58th St., expects to complete its expansion of foundry facilities in January. The program, costing $1,900,000, will increase foundry capacity 100 per cent.

CLEVELAND—Angle Products Co., 9002 Madison Ave., sheet metal jobber, has purchased a one-story building at 8327 Clinton Rd. for around $42,000. The building will be used for storage.

CLEVELAND—Weatherhead Co., 300 E. 131st St., plans to purchase machinery and equipment and possibly acquire and rehabilitate a plant which it is now operating under lease with part of the proceeds from a stock offering. Leasing and equipping an additional plant is also proposed.

CLEVELAND—Midwest Pump & Development Corp., Fairview Village, O., has been formed by William C. Nilges, 4209 W. 189th St., who plans to establish a machine shop and experimental laboratory in Cleveland.

CLEVELAND—Cuyahoga Bearings & Supply Co., 4902 Euclid Ave., formerly an individual proprietorship, has been incorporated by Fred Leroy, same address, with 250 shares of no par value.

ELYRIA, O.—Elyria Body & Machine Co. Inc., 113 East Ave., newly formed, has purchased the stock of Elyria Body & Machine Co. Gerald A. Doyle, attorney, NBC Bldg., Cleveland, is president of the newly formed company.

PAINESVILLE, O.—Bupel Metals Co., subsidiary of Butler Bros. Mining Co., 137 Eighth St., St. Paul, is planning erection of an iron powder plant. Exact site has not been disclosed.

SHILOH, O.—Shiloh Plating & Mfg. Co., Clarence G. Cale, supervisor, has been formed by R. G. and G. W. Taylor of Taylor Metal Products Co., 335 W. Sixth St., Mansfield, O., Clarence G. Cale, Shelby, O., and Harold E. Beshey, Lake Erie Plating, 3045 Carnegie Ave., Cleveland. The Shiloh company will operate a local plant owned by the Taylor firm.

SPRINGFIELD, O.—Superior Engine Division, National Supply Co., 1401 Sheridan Ave., is planning construction of a foundry addition to cost $160,000.

TORONTO, O.—Ohio Edison Co. is planning improvements to coal handling facilities at local steam-electric generating plant. Cost of project is estimated at $180,000.

TEXAS

AMARILLO, TEX.—Arizona Pipe Line Co., c/o J. B. Mills, Southland Life Bldg., Dallas, Tex., is planning construction of 600-mile, 8-inch crude oil pipeline between vicinity of Amarillo and Phoenix, Ariz., to cost $8 million. F. E. Richardson, Phoenix, is the engineer.

FT. WORTH, TEX.—Leonard Bros., 200 Houston St., will use own forces to build one-story, 200 x 450 ft warehouse, 701 Hampton St. Construction will cost $100,000. Wyatt C. Hedricks, First National Bank Bldg., is architect.

HOUSTON, TEX.—Gulf Portland Cement Co., Shell Bldg., has asked for bids on manufacturing plant expansion, to cost $1 million, and cement warehouse, to cost $100,000.

HOUSTON, TEX.—Houston Belting & Supply Co., 1115 Austin St., has asked for bids on 100 x 125-ft warehouse, to cost $55,000. W. L. Bass, 2 Rockleigh St., is architect.

HOUSTON, TEX.—Anchor Post Fence Co. of Texas, 1505 Gentry St., will soon let contract for warehouse to cost $60,000. Wyatt C. Hedricks, 5201 Fannin St., is engineer and architect.

CANADA

NEW WESTMINSTER, B. C.—R. Walker & Sons Ltd. has awarded contract to A. Ward & Sons Ltd., 131 Eleventh Ave., for construction of automotive machine plant, estimated to cost $50,000.

NEW WESTMINSTER, B. C. — Westminster Iron Works Co. Ltd., 66 Tenth St., has awarded contract for two-story, 175 x 212-foot, machine shop, steel shop, warehouse, stockroom and office to Ward & Son Ltd., 131 Eleventh Ave., for $55,000. C. T. Hamilton, 615 W. Hastings St., Vancouver, B. C., is the engineer.

VANCOUVER, B. C.—Burrard Nail & Bolt Co., 509 Richards St., plans construction of nail plant to cost about $25,000. H. Cullerne, 525 Howe St., is architect.

NEW GLASGOW, N. S.—L. E. Shaw Ltd., 74 Bedford Row, Halifax, N. S., has awarded contract for one-story, 50 x 150-foot, 41 x 80-foot and 65 x 125-foot, plant units to Fraser, Mason & Fraser, Lorne St., for about $150,000.

FT. WILLIAM, ONT.—Great Lakes Paper Co. Ltd. plans to start work soon on plant alterations and additions and installation of equipment, estimated to cost approximately $2 million.

HAMILTON, ONT.—Stanley Works of Canada Ltd., Gerrard St., is having plans prepared by Prack & Prack, architects, 36 James St. S., for construction of plant addition, to cost about $65,000.

ORILLIA, ONT.—Otaco Ltd. is having plans prepared for construction of a foundry on West St., to cost about $60,000.

STEWARTVILLE, ONT.—Ontario Hydro-Electric Commission, 620 University Ave., Toronto, Ont., is planning construction of two dams and plants to generate 80,000 hp, costing $10 million.

TORONTO, ONT.—Prest-O-Lite Battery Co. Ltd., 1352 Dufferin St., has awarded contract for plant addition to cost about $50,000 to Bradford-Hoshal Ltd., 1170 Yonge St.

TORONTO, ONT.—Mine Safety Appliances Co. of Canada Ltd., 139 Kendal Ave., has awarded contract to Milne & Nichols Ltd., 57 Bloor St. W., for construction of plant to cost about $125,000. Prack & Prack, 36 James St. S., Hamilton, Ont., are architects.

MONTREAL, QUE.—Gypsum Lime & Alabastine Canada Ltd., Paris, Ont., has asked for bids on gypsum rock plant with storage facilities, Lakefield Ave., Montreal, to cost about $300,000.

MONTREAL, QUE.—International Harvester Co. of Canada Ltd.. Hamilton, Ont., is having plans prepared by Ross & Ross, architects, 1010 St. Catharine St. W., for construction of plant and offices, Upper Lachine Rd., to cost about $250,000.

MOUNT ROYAL, QUE.—Standard Structural Steel Ltd., 6333 St. Lawrence Blvd., contemplates construction of fabricating plant, estimated to cost $75,000.

SASKATOON, SASK.—Canadian General Electric Co. Ltd., 209 Birks Bldg., has awarded contract for warehouse at Second Ave. N. to Pigott Construction Co. Ltd., 502 Fifth Ave. N., to cost about $70,000.

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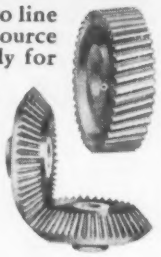

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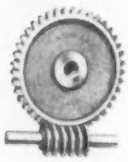

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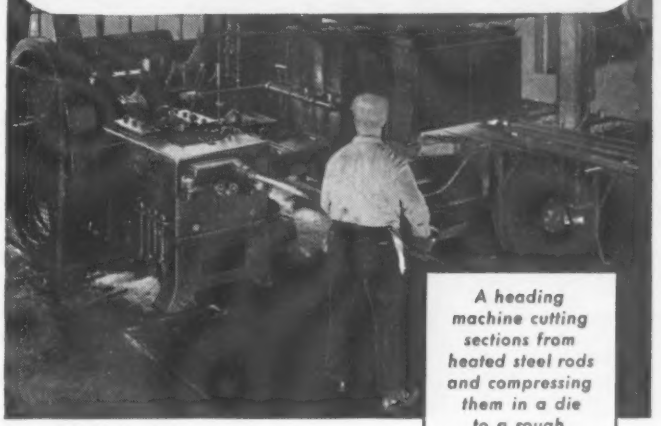

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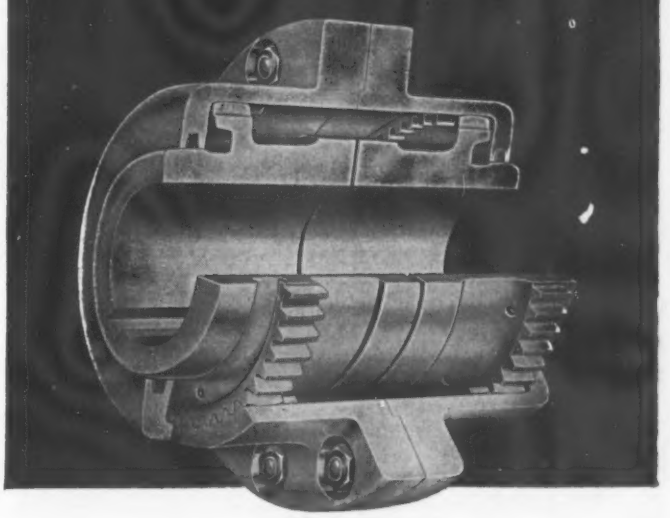

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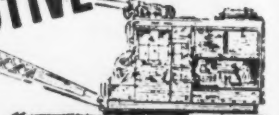

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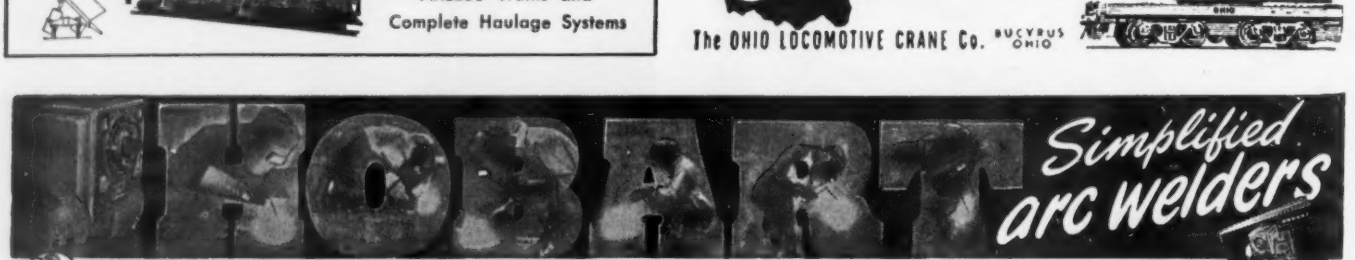

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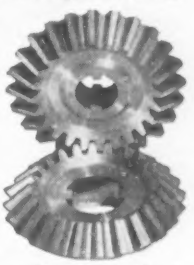

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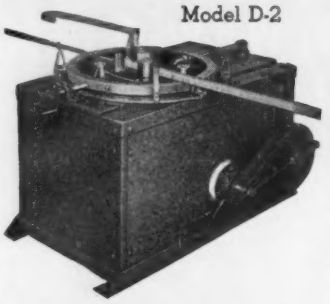

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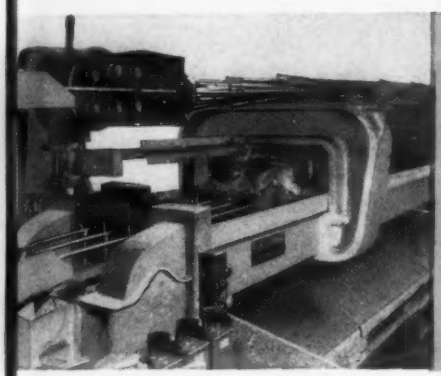
e three drawbench developments an-
d here by Aetna-Standard answer your de-
for equipment which simplifies material han-
nd increases output of cold drawn bars or tubes.



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THE
ETNA-STANDARD ENGINEERING COMPANY

LOOK OVER THESE THREE CAREFULLY

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ASSOCIATED COMPANY
WRIGHTSON & COMPANY, LIMITED, MIDDLEBOROUGH, ENGLAND

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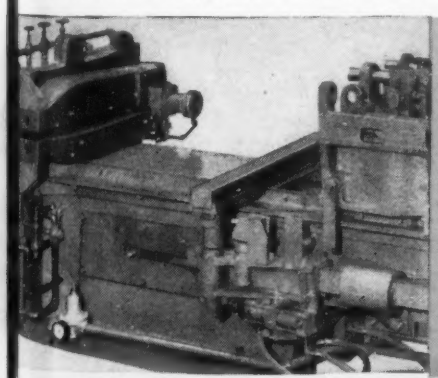
SINGLE, DOUBLE, OR TRIPLE
PULL-THROUGH SHEAR
1, 2, OR 3 BARS



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PULL-THROUGH SHEAR—Take any size bar up to 1" in round, hexagon, or flat and the pull through shear will shear 'em 1, 2, or 3 at a time in any length you need. Speeds production when drawing bars from coils.

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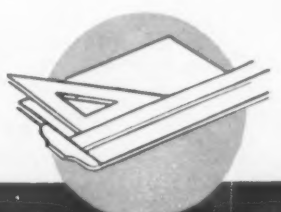

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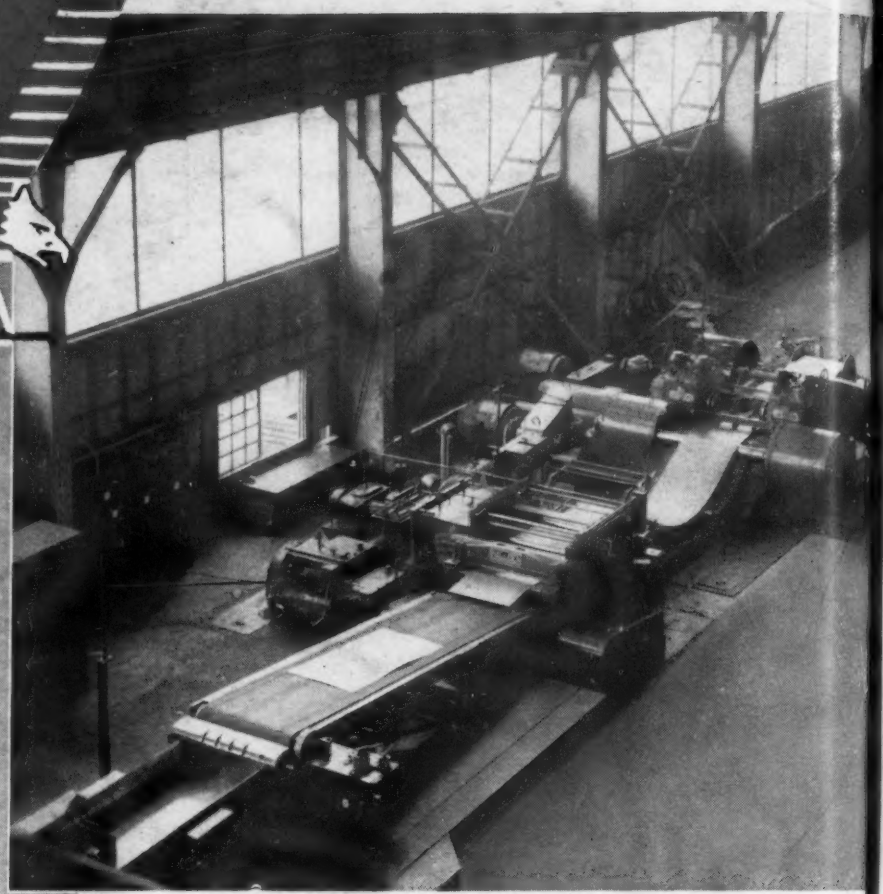

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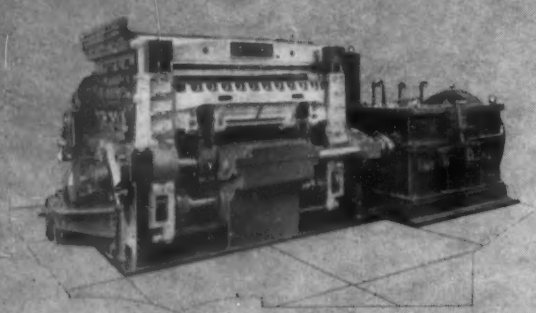

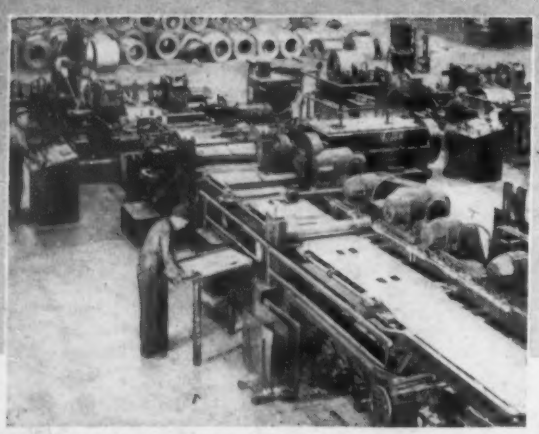

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